



TOSHIBA

SERVICE MANUAL

1550, 1560

PLAIN PAPER COPIER

PAPER FEEDING UNIT MY-1004



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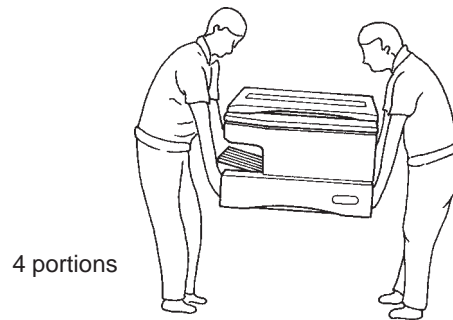


GENERAL PRECAUTIONS REGARDING THE INSTALLATION AND THE SERVICE OF THE 1550/1560/MY-1004

1. Transportation/Installation

- When transporting/installing the copier, using two persons, be sure to use the positions as indicated below.

The copier is fairly heavy and weighs approximately 35 kg (76.8 lb), therefore pay full attention when handling it.



2. Installation

- Be sure to use a dedicated outlet with AC 115V/15A (220V, 240V/10A) or more for its power source.
- The copier must be grounded for safety.
Never ground it to a gas pipe or a water pipe.
- Select a suitable place for installation.
Avoid excessive heat, high humidity, dust, vibration and direct sunlight.
- To insure adequate working space for the copying operation, keep a minimum clearance of 80 cm (31.5") on the left, 80 cm (31.5") on the right and 10 cm (3.9") in the rear.

3. Service of Machines

- Basically, be sure to turn the main switch off and unplug the power cord during service.
- Be sure not to touch high temperature sections such as the exposure lamp, the fuser unit, the damp heater and their periphery.
- Be sure not to touch high-voltages sections such as the chargers and the high-voltage transformer.
- Be sure not to touch rotating/operating sections such as gears, belts, pulleys, etc.
- When servicing the machines with the main switch turned on, be sure not to touch live sections such as the lamp terminal etc.
- Use suitable measuring instruments and tools.

4. Main Service Parts for Safety

- The thermofuse, thermistor, fuse, breaker and door switch, etc. are particularly important for safety. Be sure to handle/install them properly.

5. Notice Labels

- Be sure to check the rating plate and the notice labels such as “Unplug the power cord during service”, “Hot area” etc. to see if there is any dirt on their surface or if they are properly stuck to the copier during servicing.

6. Disposition of Consumable Parts/Packing Materials

- Regarding the recovery and disposal of the copier, consumable parts and packing materials, it is recommended to follow the relevant local regulations or rules.

7. When parts are disassembled, reassembly is basically the reverse of disassembly unless otherwise noted in this manual or other related documents. Be careful not to reassemble small parts such as screws, washers, pins, E-rings, toothed washers in the wrong places.

8. Basically, the machine should not be operated with any parts removed or disassembled.

Multiple copying Up to 999 sheets

Setting to adjustment mode allows selection of 9, 99, 500 and 999 copies.

Reproduction ratio Actual size 1:1

By setting to adjustment mode, vertical reproduction only can be altered to 1:1.01.

Reduction/Enlargement 3R3E

50, 65, 78, 129, 154, 200% (For U.S.A, Canada)

50, 71, 82, 122, 141, 200% (For Europe)

Paper feeding

	Type	Capacity
Cassette	Front Loading	500 sheets (50 mm or less)
Manual	* Foldable tray	1 sheet

* For Europe

Manual start: At the time of shipping, the copying operation is started by the PRINT key. By inputting data for adjustment mode, it can be changed to auto-start.

Toner supply Automatic density detection and replenishment

Toner cartridge replacement method

Exposure Automatic control and manual control

Weight 35 kg

Power source 110 V – 50/60 Hz

115V – 60 Hz

127 V – 60 Hz

220 V – 50/60 Hz

220~240 V – 50/60 Hz

Power consumption ... 1.5 kW or less

Total counter Mechanical total counter (6 digits)

Machine size See the next page.

1.1.2 1560

The differences from the 1550 are shown below.

Bypass

Copying speed 8 copies/minute (all sizes)

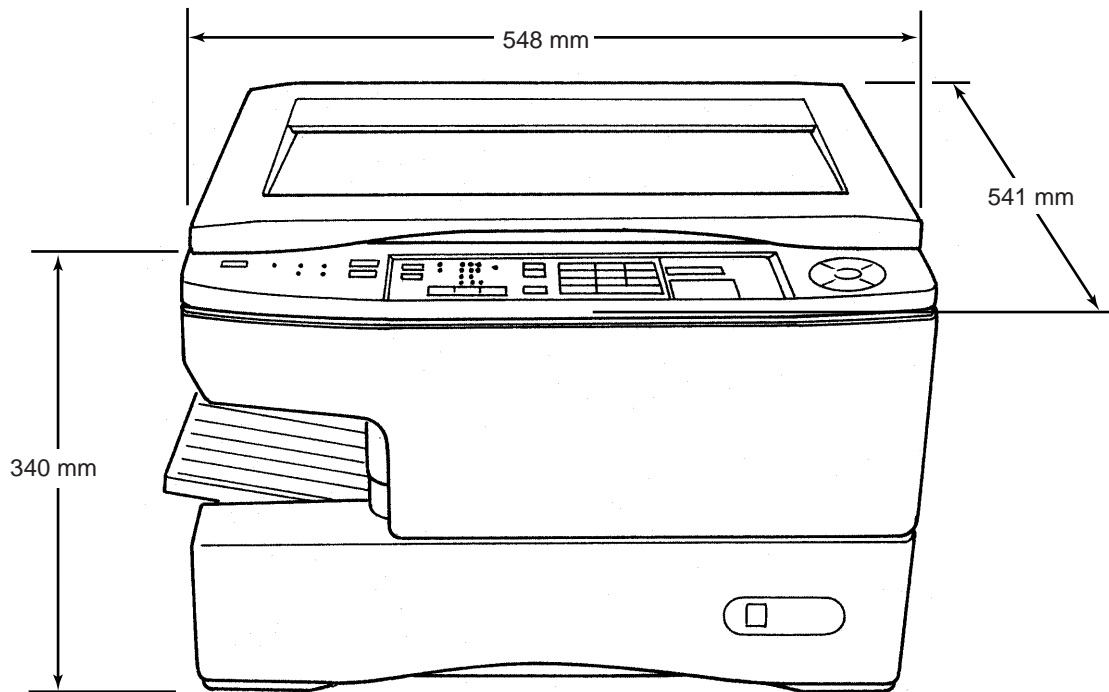
Size A3~A5-R

LD~ST-R

Paper stacking capacity

..... 60 copies

Copy paper size 64~80g/m² : 60 copies stacking
16~22lbs : 60 copies stacking
80~130g/m² : single-sheet feeding
22~34lbs : single-sheet feeding
Weight of machine 38kg
Size of a machine W571 x D541 x H340mm



1.2 Accessories

Copy receiving tray	1 pc
Operator's manual	1 pc
Drum	1 pc
Lever caps	2 pcs
Setup report	1 pc

1.3 Options and Supplies

Options

Automatic document feeder	MR-2004LT	660 84890	For Europe
	MR-2004A4	660 84891	
Sorter	MG-1003	660 84838	
Key copy counter (6 digit)	MU-8	660 02050	
Key copy counter kit	MU-10	660 02051	
Counter bracket kit	KN-1550K	660 84840	
Cassette	KC-1550AF	660 84841	
	KC-1550LF	660 84842	
	KC-1550AFE	660 84914	
Damp heater kit	MF-1550U	660 84848	
	MF-1550E	660 84849	
Paper feed unit	MY-1004L	660 84835	For Europe
	MY-1004AE	660 84913	
	MY-1004A	660 84836	
Sorter bracket kit (for MG-1003)	KN-1550S	660 84839	

Supplies

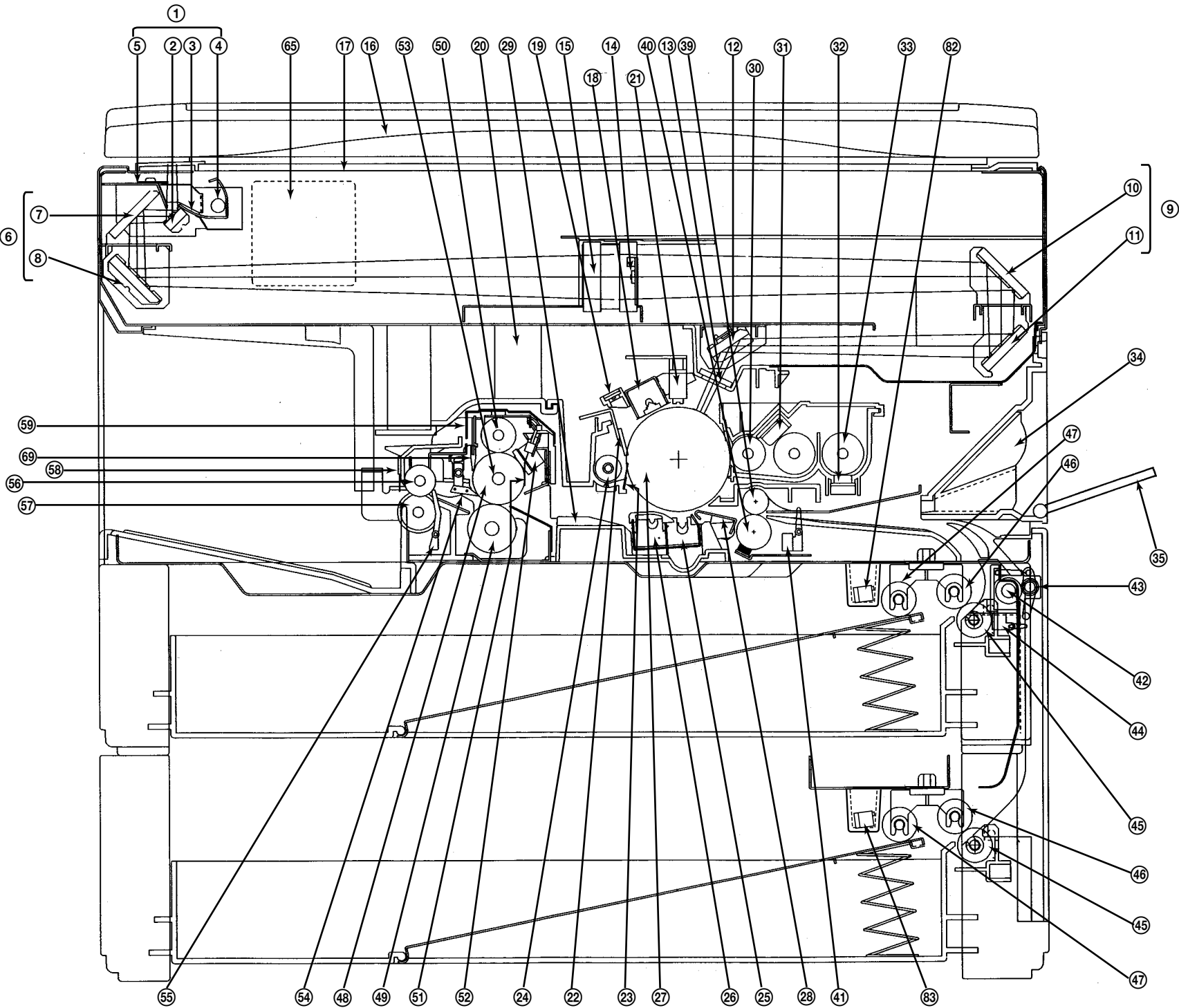
Drum	PS-OD1550	66084854
Developer material	PS-ZD1550	66084853
Toner	PS-ZT1550	66084851
Toner (for Europe)	PS-ZT1550E	66084852
Toner bag	PS-TB1550	66084859
Toner bag (for Europe)	PS-TB1550E	66084860

2. OUTLINE OF THE MACHINE

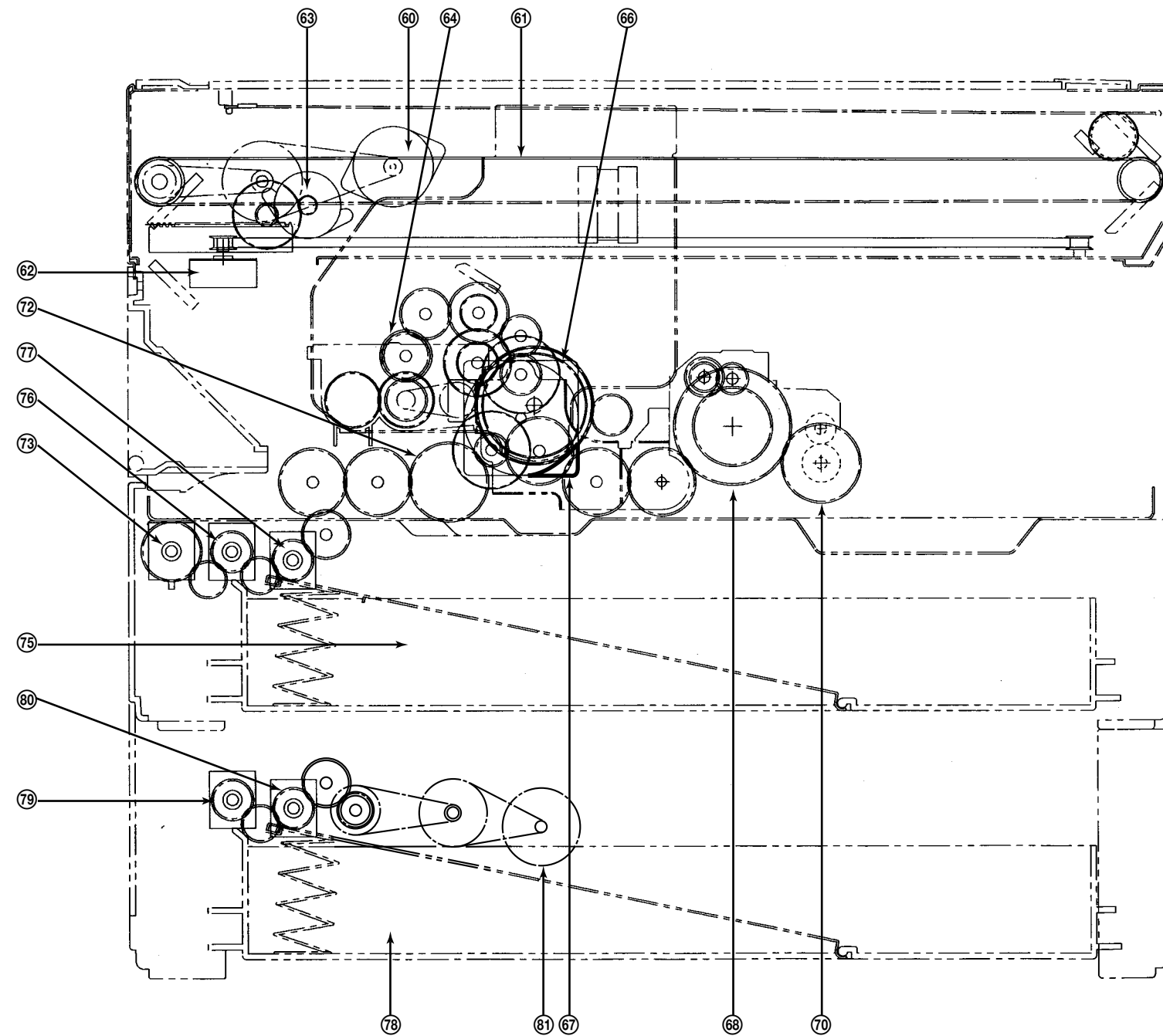
2.1 Sectional Views and Electrical Parts Location Diagram

2.1.1 Front and rear sectional views for the 1550

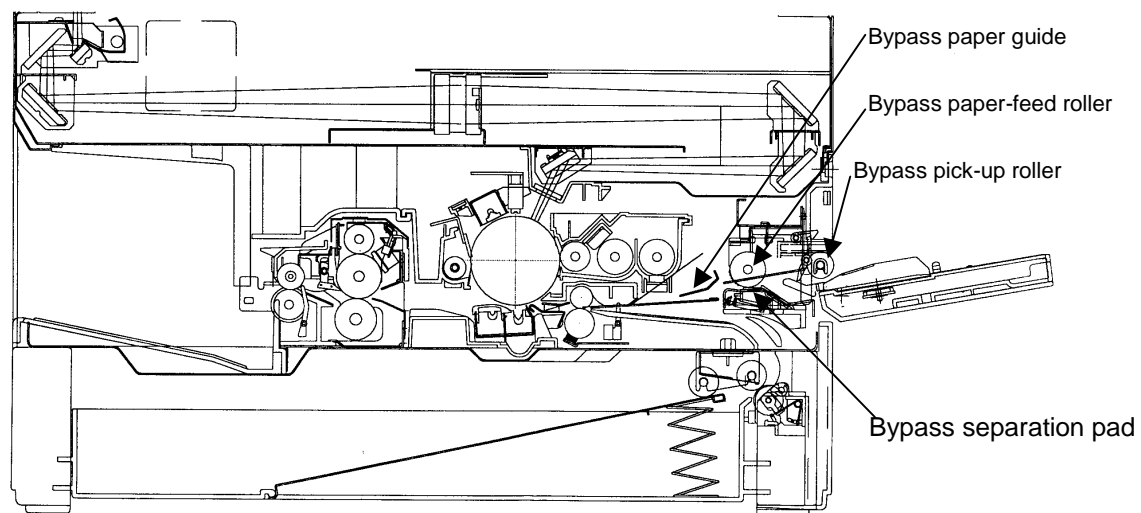
1	Carriage 1	30	Magnetic roller
2	Mirror 1	31	Leveler (doctor)
3	Reflector	32	Auto toner sensor
4	Exposure lamp	33	Mixer
5	Exposure adjustment plates	34	Bypass feed guide
6	Carriage 2	35	Bypass feed tray
7	Mirror 2	39	Aligning roller (upper)
8	Mirror 3	40	Aligning roller (lower)
9	Mirror unit	41	Aligning switch
10	Mirror 4	42	Transport roller (left) (MY-1004)
11	Mirror 5	43	Transport roller (right) (MY-1004)
12	Mirror 6	44	Paper stop switch (MY-1004)
13	Slit glass	45	Separation roller
14	Auto exposure PC board	46	Feed roller
15	Lens	47	Pick-up roller
16	Original cover	48	Heat roller
17	Original glass	49	Heat roller (lower)
18	Main charger	50	Cleaning felt roller
19	Discharge lamp	51	Thermistor
20	Ozone filter	52	Thermostat
21	LED erasing array	53	Heater lamp
22	Main blade	54	Separation claws
23	Recovery blade	55	Exit switch
24	Toner recovery auger	56	Exit roller (upper)
25	Transfer charger	57	Exit roller (lower)
26	Separation charger	58	Discharge brush
27	Drum	59	Fuser guard
28	Pre-transfer bias guide	65	Air filter
29	Transport guide	69	Cleaning blade
		82	Paper empty switch
		83	Empty switch (MY-1004)



60	Scanning motor
61	Carriage drive wire
62	Lens motor
63	Mirror motor
64	Developer-unit drive gear
66	Drum gear
67	Main motor
68	Heat roller gear
70	Exit roller gear
72	Aligning roller clutch
73	Transport roller clutch (MY-1004)
75	Cassette
76	Feed roller clutch
77	Pick-up roller clutch
78	(PFU) cassette (MY-1004)
79	(PFU) feed roller clutch (MY-1004)
80	(PFU) pick-up roller clutch (MY-1004)
81	(PFU) drive motor (MY-1004)

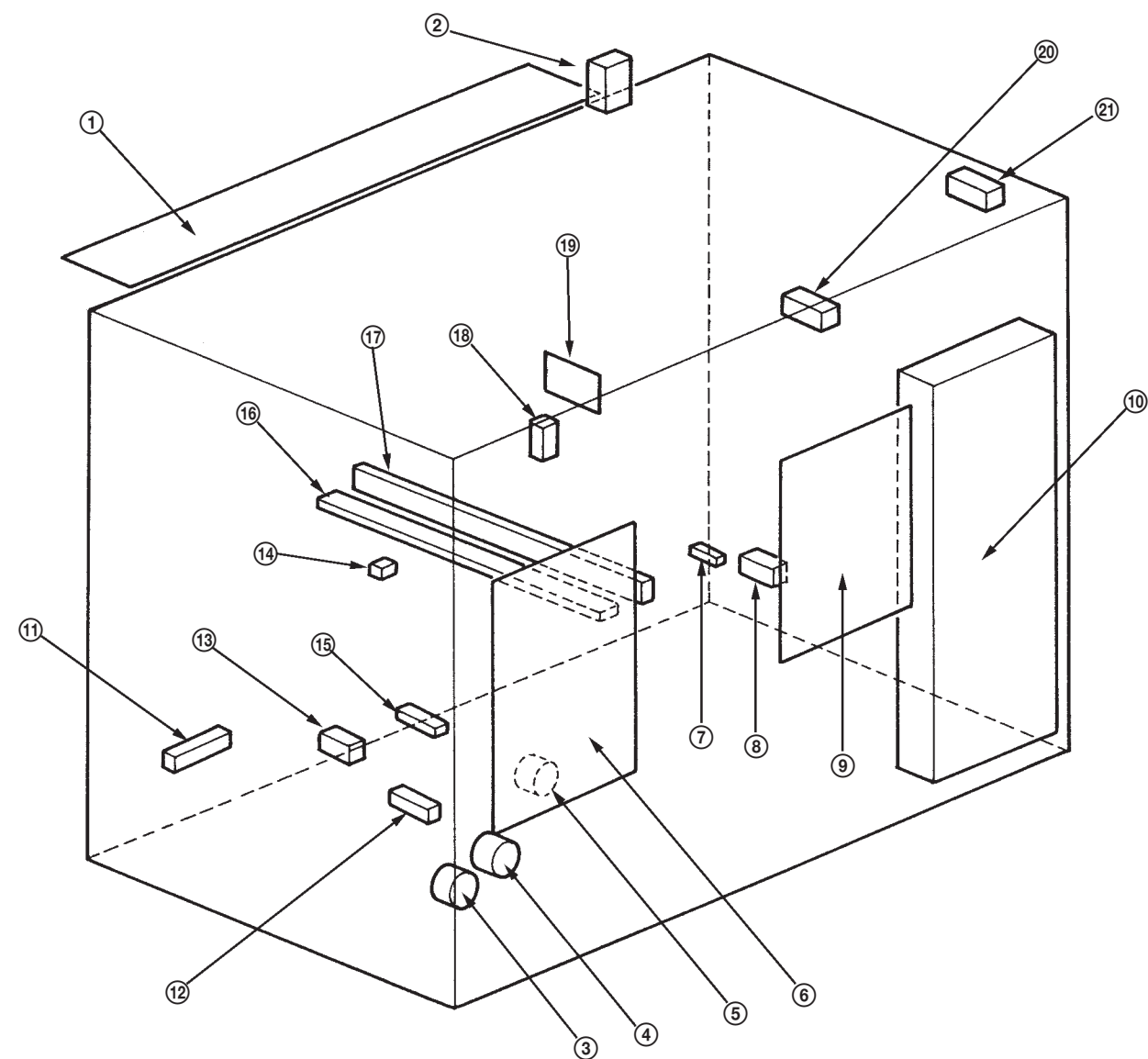


2.1.2 Front and Rear sectional views for the 1560
(The differences from the 1550)



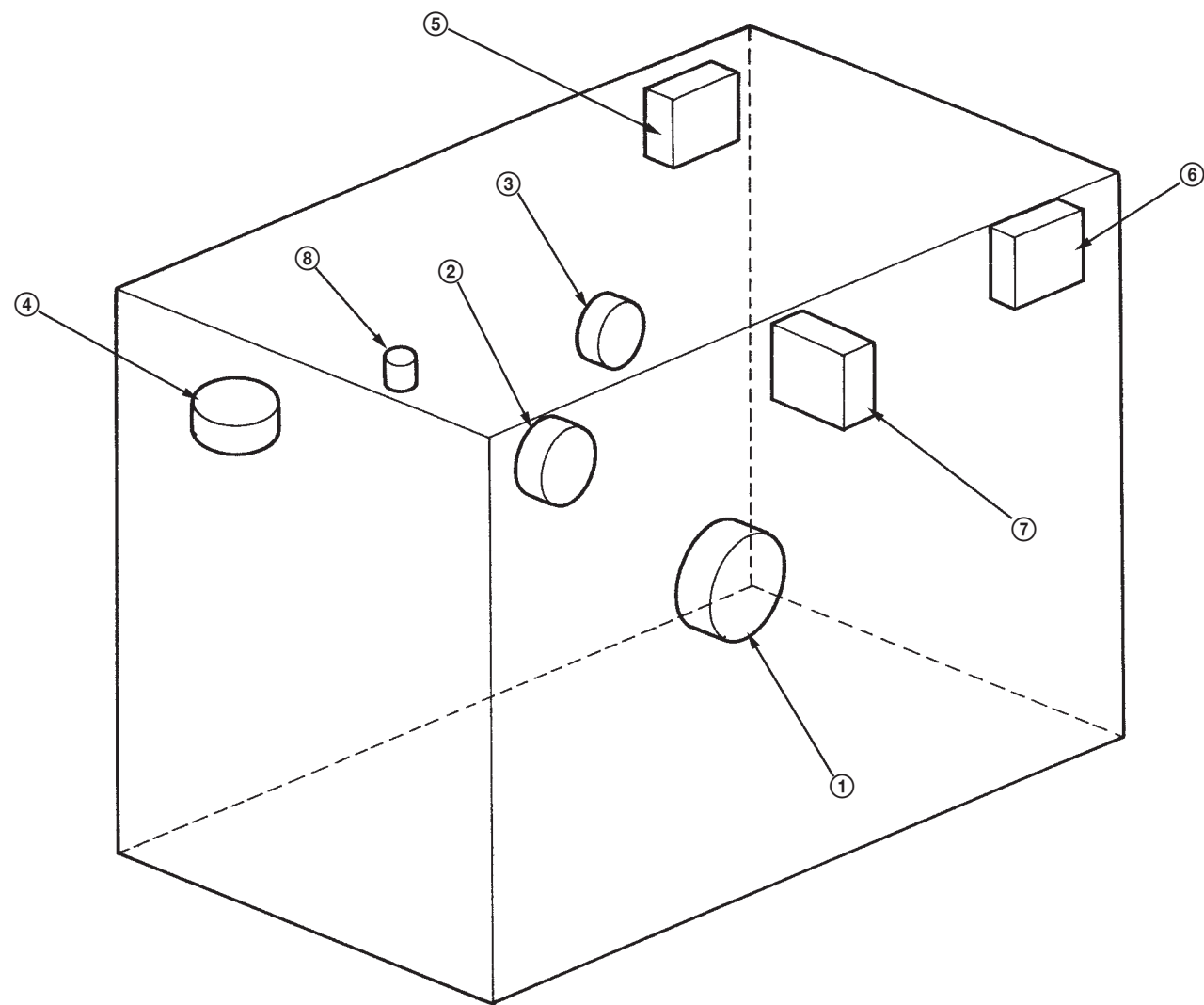
2.1.3 Electrical parts location diagram

[A] DC electrical parts excluding motors



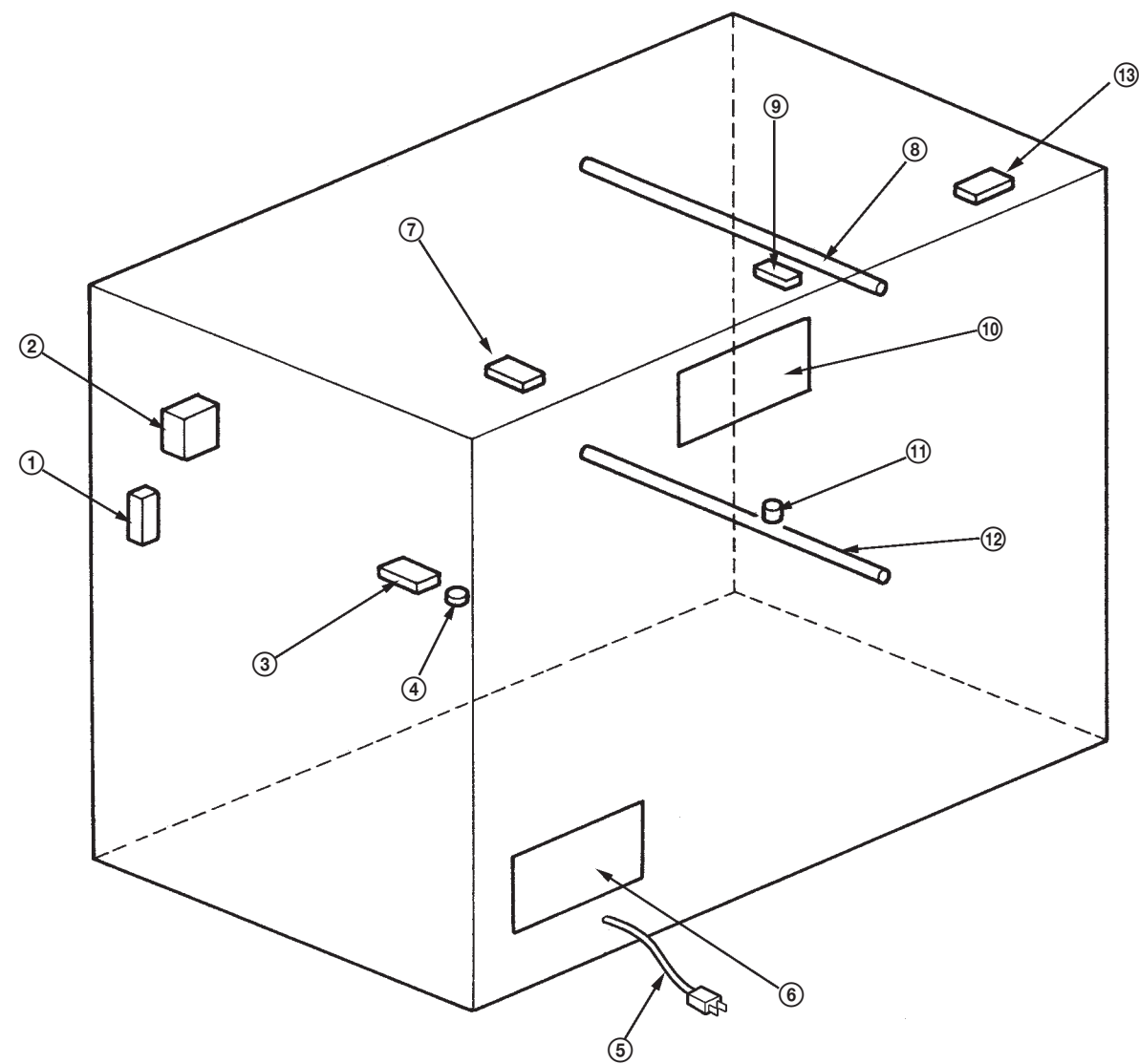
Symbol	Name
1	Control panel PC board (PWA-F-PNL)
2	Total counter (T-CTR)
3	Feed roller clutch (FED-CLT)
4	Pick-up roller clutch (PKUP-CLT)
5	Aligning roller clutch (CLT-REG)
6	High-voltage transformer (PS-HVT)
7	Heat roller thermistor (THMS-HTR)
8	Exit switch (EXT-SW)
9	Logic PC board (PWA-F-LGC)
10	Power supply unit (PS-ACC)
11	Size switch (SIZE1-SW)
12	Paper empty switch (EMP2-SW)
13	Aligning switch (RGT-SW)
14	Toner-full switch (T-FUL-SW)
15	Auto-toner sensor (SNR-ATC)
16	Eraser lamp PC board (ASM-F-ERS)
17	LED discharge array PC board (ASM-DCH)
18	Mirror switch (MRR-SW)
19	Auto-exposure PC board (PWA-F-AES)
20	Lens switch (LNS-SW)
21	Home switch (HOME-SW)

[B] Electrical parts such as motors



Symbol	Name
1	Main motor (MAIN-MTR)
2	Scanning motor (SCN-MTR)
3	Mirror motor (MRR-MTR)
4	Lens motor (LNS-MTR)
5	Front optics fan (OPT-FAN-F)
6	Rear optics fan (OPT-FAN-R)
7	Exit fan (EXIT-FAN)
8	Toner motor (TNR-MTR)

[C] AC electrical parts



Symbol	Name
1	Door switch (DOOR-SW)
2	Main switch (MAIN-SW)
3	Damp heater L (D-HTR-L)
4	Thermostat
5	AC power cable
6	Fuse PC board (PWA-F-FUS)
7	Damp heater U1 (D-HTR-U1)
8	Exposure lamp (EXPO-LAMP)
9	Thermofuse (FU-EXPO)
10	Lamp regulator PC board (PS-LRG)
11	Heater thermostat (K-THMO)
12	Heater lamp (HTR-LAMP)
13	Damp heater U2 (D-HTR-U2)

2.2 Symbol and Function of Electrical Parts

Go to 1550 DC Harness
Connection Diagram

Go to 1560 DC Harness
Connection Diagram

(1) Motors

* Refer to SERVICE PARTS LIST ED-1550

Symbol	Code name	Function	Remarks	*Page/item No.
M1	MAIN-MTR (Main motor)	Drives the drum, developer and heat roller	IC motor	P9, I1
M2	SCN-MTR (Scanning motor)	Scans the optical system	Pulse motor	P8, I14
M3	LNS-MTR (Lens motor)	Drives the lens unit	Pulse motor	P8, I4
M4	MRR-MTR (Mirror motor)	Drives the mirror unit	Pulse motor	P8, I4
M6	OPT-FAN-F (Optics fan (front))	Cools the optical system	IC motor	P3, I8
M7	OPT-FAN-R (Optics fan (rear))		□60	
M8	EXIT-FAN (Exit-fan)	Cools the drum and cleaner	IC motor: □60	P3, I8
M9	TNR-MTR (Toner motor)	Replenishes the toner	Brush motor	P17, I31

(2) Electromagnetic spring clutches

Symbol	Code name	Function	Remarks	*Page/item No.
CLT1	RGT1-CLT (Aligning roller clutch)	Transmits aligning roller drive.		P7, I4
CLT2	FED1-CLT (Feed roller clutch)	Transmits feed roller drive.		P7, I22
CLT3	PKLP-CLT (Pick-up roller clutch)	Transmits pick-up roller drive.		P7, I22

(3) Counters

Symbol	Code name	Function	Remarks
T	T-CTR (Total counter)	Total counter	6-digit
K	K-CTR (Key-copy counter)	Individual counter	6-digit (option)

(4) Switches

Symbol	Code name	Function	Remarks	*Page/item No.
S1	MAIN-SW (Main switch)	Power supply	Tumbler type	P4, I2
S2	DOOR-SW (Door switch)	For safety, cancels abnormal condition	Push switch	P4, I4
S3	EMP1-SW (Paper-empty switch 1)	Detects lack of paper in the cassette	Reflecting photo sensor	P6, I20
S4	SIZE1-SW (Size switch)	Detects cassette size	Push switch	P6, I26
S5	RGT-SW (Aligning switch)	Detects paper in front of the aligning roller	Photointerruptor	P7, I15
S6	EXIT-SW (Exit switch)	Detects exiting paper	Photointerruptor	P20, I15
S7	HOME-SW (Home switch)	Detects home position of the optical system	Photointerruptor	P12, I16
S8	LNS-SW (Lens switch)	Detects home position of the lens unit	Photointerruptor	P12, I16
S9	MRR-SW (Mirror switch)	Detects home position of the mirror unit	Photointerruptor	P8, I27
S10	T-FUL-SW (Toner-full switch)	Detects when the used toner bag is full	Microswitch	P17, I22

(5) Heaters and lamps

Symbol	Code name	Function	Remarks	*Page/item No.
EXP	EXPO-LAMP (Exposure lamp)	Exposes the original	Halogen lamp 300W	P10, I14
HTR	HTR-LAMP (Heater lamp)	Fixing	Halogen lamp 900W	P19, I6
ERS	ERS-LAMP (Discharge lamp)	Discharges the drum	LED type	P15, I14
DCH	DCH-LED (LED eraser array)	To interrupt the charge	LED	P15, I15
DHU	D-HTR-U (Damp heater U)	Keeps optical system warm (option)	PTC	P12, I33
DHL	D-HTR-L (Damp heater L)	Keeps the drum and transfer/separationcharger case warm (option)	PTC	P6, I36

(6) PC boards

Symbol	Code name	Function	Remarks	*Page/item No.
LGC	PWA-F-LGC (Logic PC board)	Controls the entire copier		P5, I14
ACC	PS-ACC (Power supply PC board)	Supplies electrical power to ICs, solenoids and motors		P5, I19
PNL	PWA-F-PNL (Control panel PC board)	Controls condition displays and operation keys		P2, I22
LRG	PS-LRG (Lamp regulator PC board)	Controls exposure lamp		P4, I35
DCH	ASM-DCH (LED eraser array PC board)	Turns on and drives LED during reduction		P15, I15
ERS	ASM-ERS (Discharge lamp PC board)	Discharge lamp		P15, I14
AES	PWA-F-AES	Reads dark/light of the original		P8, I28
FUS	PWA-F-FUS (Fuse PC board)	Fuse for the damp heater circuit.	Option	P5, I23

(7) Transformers

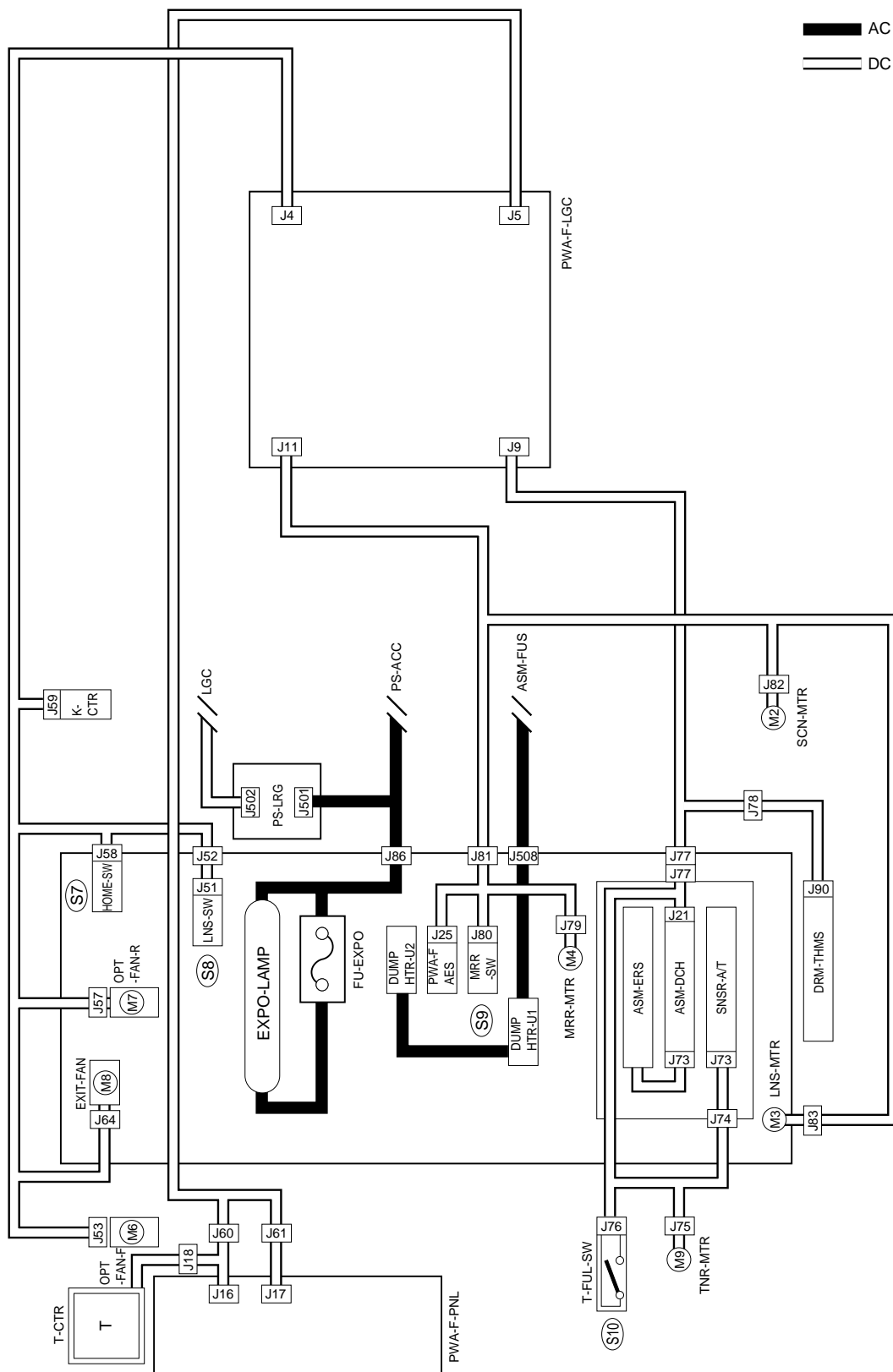
Symbol	Code name	Function	Remarks	*Page/item No.
HVT	PS-HVT (Charging transformer) (Transfer/separation transformer)	Generates high voltage electricity for charging (negative voltage) Generates high voltage electricity for transfer/separation and developing bias voltage		P5, I18

(8) Others

Symbol	Code name	Function	Remarks	*Page/item No.
ATS	SNR-ATC (Auto-toner sensor)	Reads toner density with a magnetic sensor		P18, I26
THMS	THMS-HTR (Heat-roller thermistor)	Detects temperature of the heat roller		P20, I9
THERMO	K-THERMO (Thermostat)	Prevents abnormal heating of heat roller		P20, I8
FU	FU-EXPO (Thermofuse)	Prevents abnormal heating of the exposure lamp		P10, I5
TMS-DRM	TMS-DRM (Drum thermistor)	Detects the drum temperature roughly		P3, I39

2.3 Wire-Harness Location Diagram

A. Location Diagram for Upper Unit



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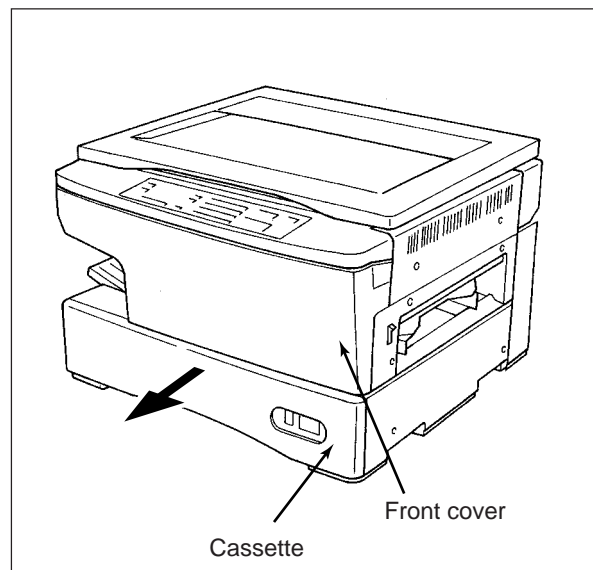


2.4 Removing Covers and Electrical Parts

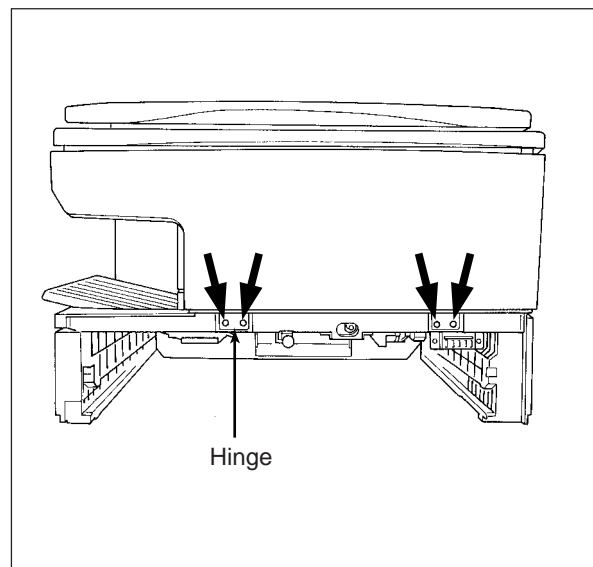
2.4.1 Removing covers

[A] Front cover

- (1) Remove the cassette (in the direction of the arrow).

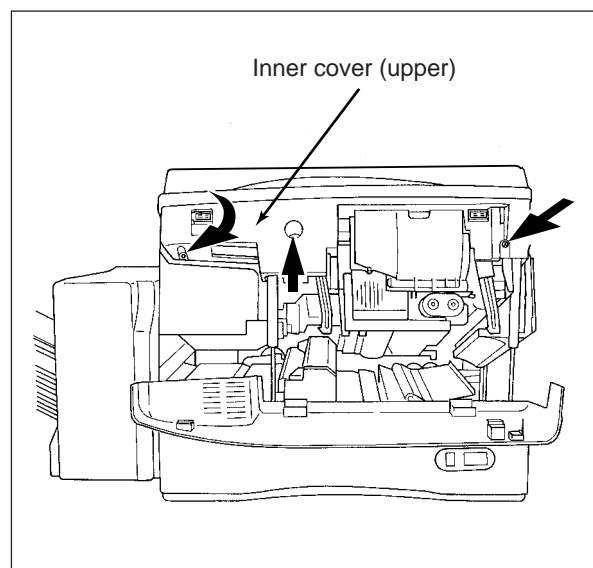


- (2) Remove the screws fastening the hinge (4 pcs.).



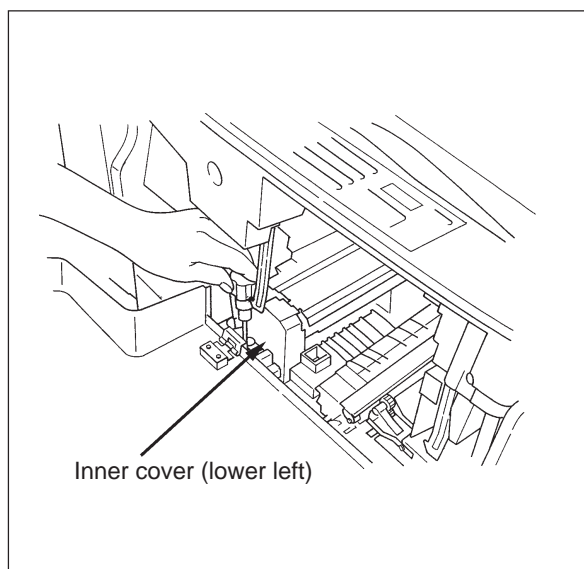
[B] Inner cover (upper)

- (1) Open the front cover.
- (2) Remove the toner cartridge.
- (3) Remove three screws.



[C] Inner cover (lower left)

- (1) Remove one screw.



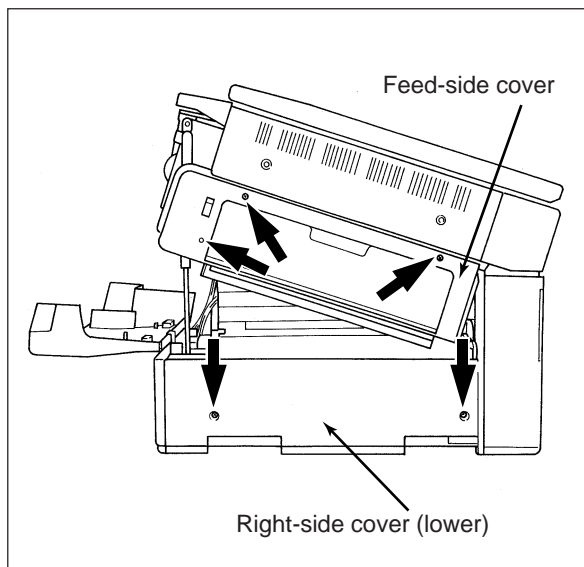
[D] Right-side covers (upper and lower) and feed-side cover

Feed-side cover

- Open the front cover.
- Raise the upper unit.
- Remove three screws.

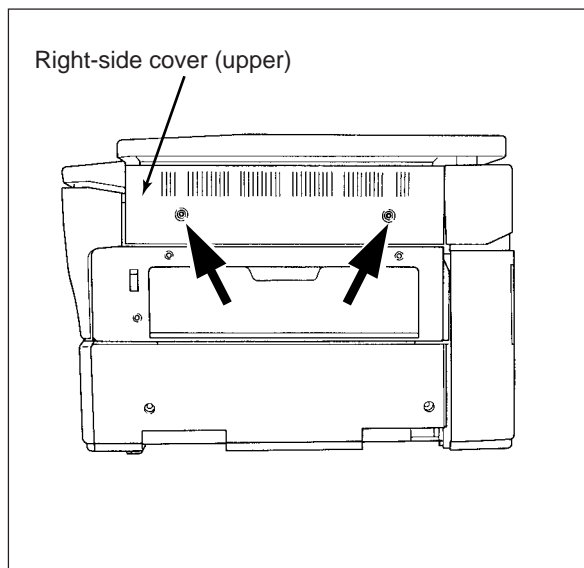
Right side cover (lower)

- Open the front cover.
- Raise the upper unit.
- Remove two screws.



Right-side cover (upper)

- Remove two screws.
- Remove the glass holder (see 2.4.1).



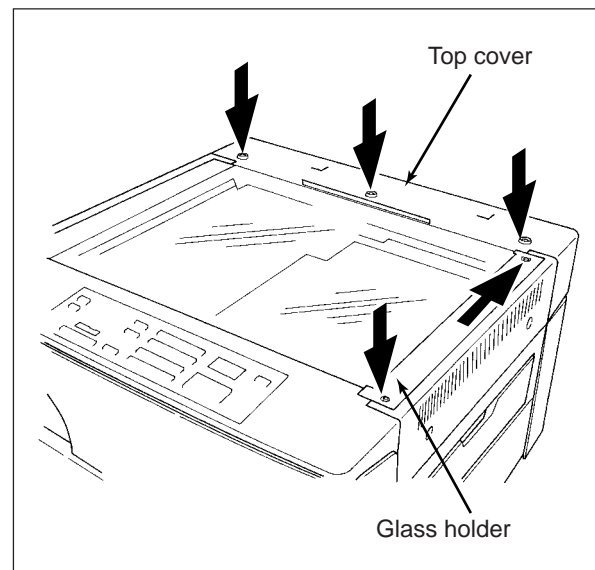
[E] Top cover and glass holder

Glass holder

- Open the original cover.
- Remove two screws.

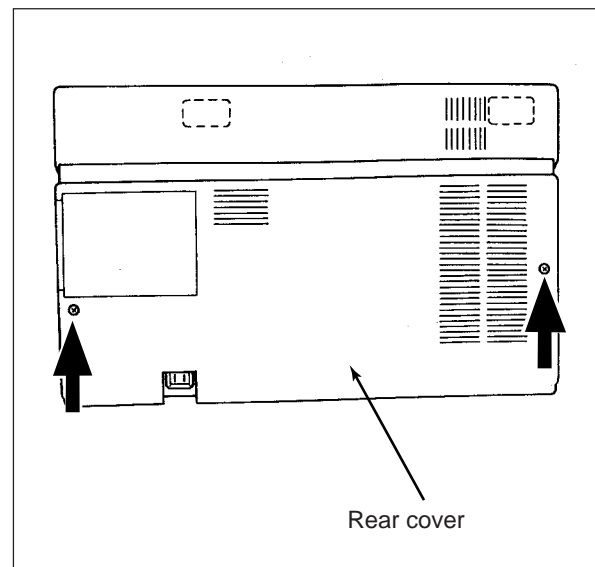
Top cover

- Remove the original cover.
- Remove three screws.



[F] Rear cover

- Remove two screws.



[G] Left-top cover, left-side cover (upper) and left-side cover (lower)

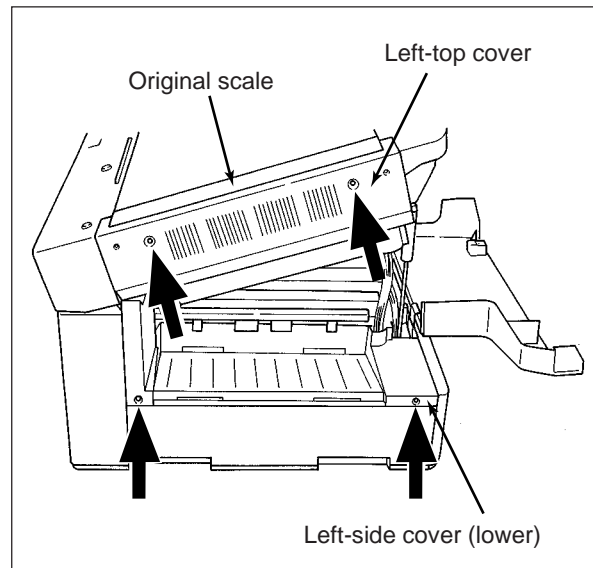
(1) Raise the upper unit.

Left-top cover

- Remove the original scale. (Two screws)
- Remove two screws.

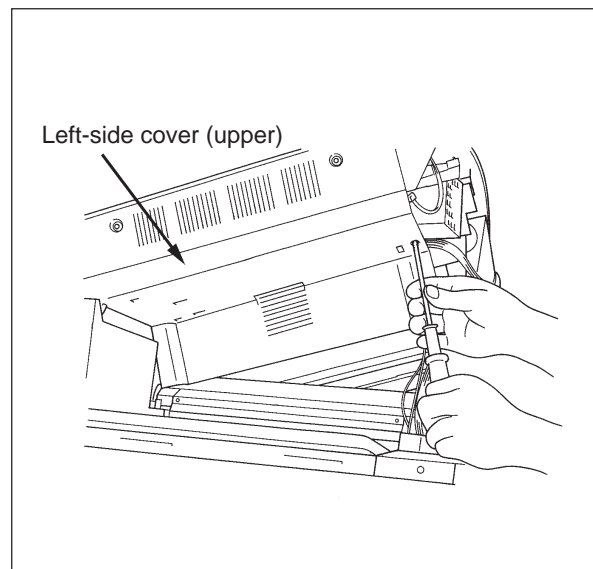
Left-side cover (lower)

- Remove two screws.



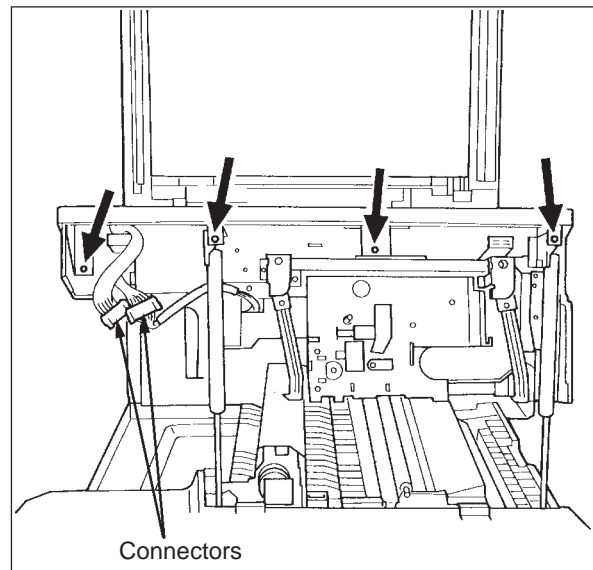
Left-side cover (upper)

- Remove one screw.



[H] Control panel cover

- (1) Raise the upper unit and remove the inner cover (upper).
- (2) Disconnect two connectors and remove four screws.



2.4.2 Removal and installation of electrical parts

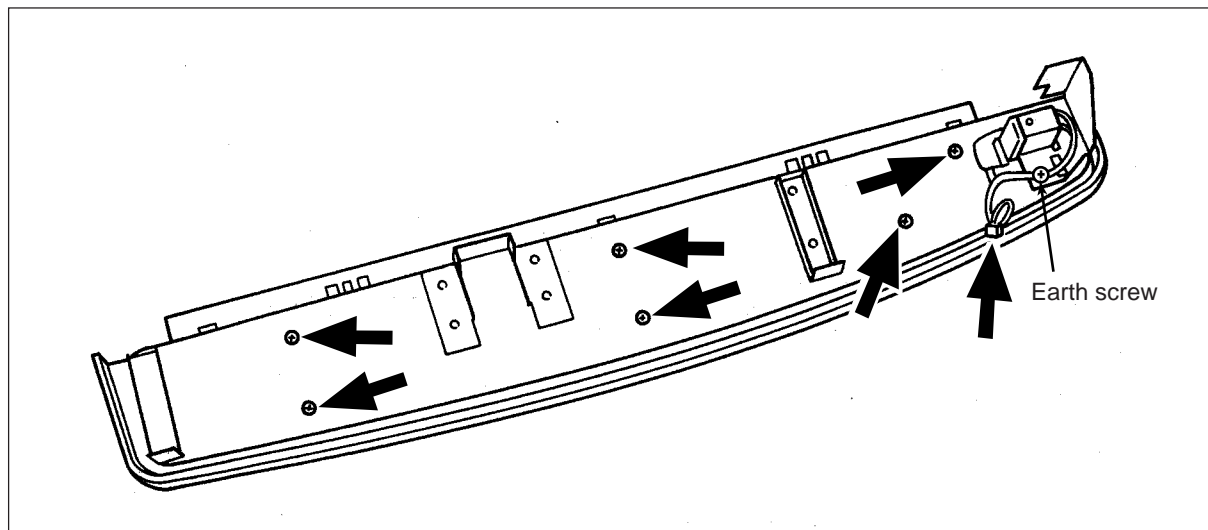
[A] Remove the control-panel (PWA-F-PNL) PC board

- (1) Remove the control panel cover.

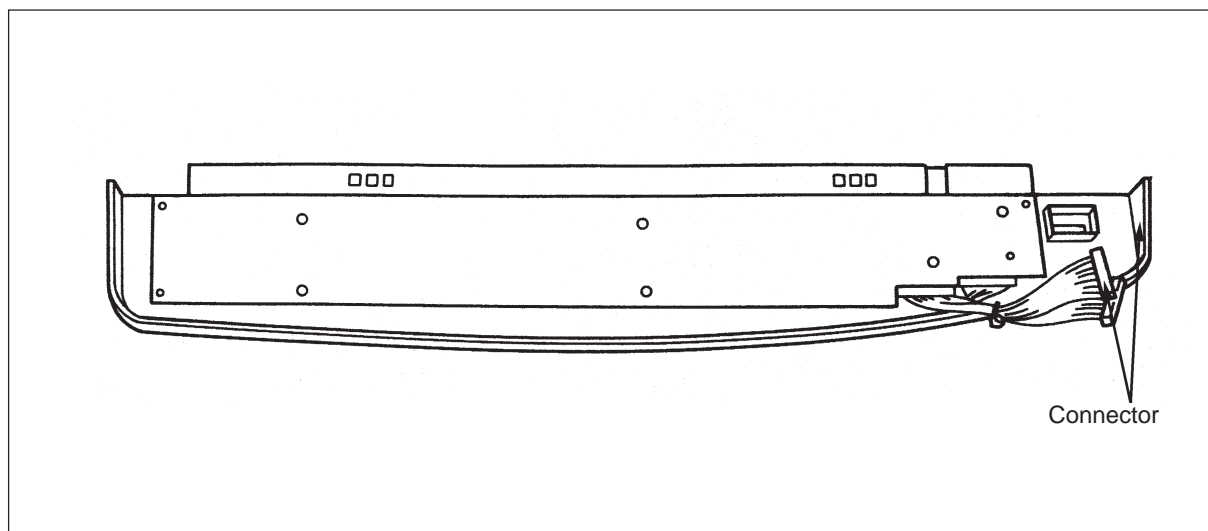
Refer to 2.4.1 [H].

- (2) Place the control panel cover upside down and remove its metal cover (6 screws).

Remove the earth screw of the shield. Remove the counter connector.



- (3) When you remove nine (9) screws, the control-panel PC board can be taken out along with the harness. They can be separated if you disconnect two connectors.

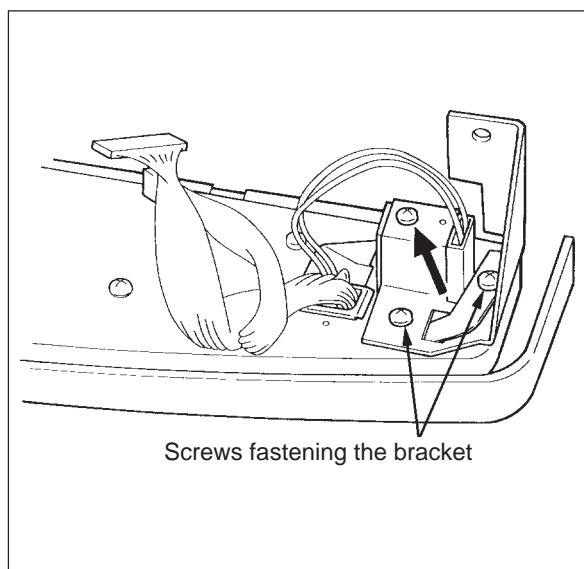


Note: Be careful not to allow the ground wire of the shield to be cut.

[B] Total counter

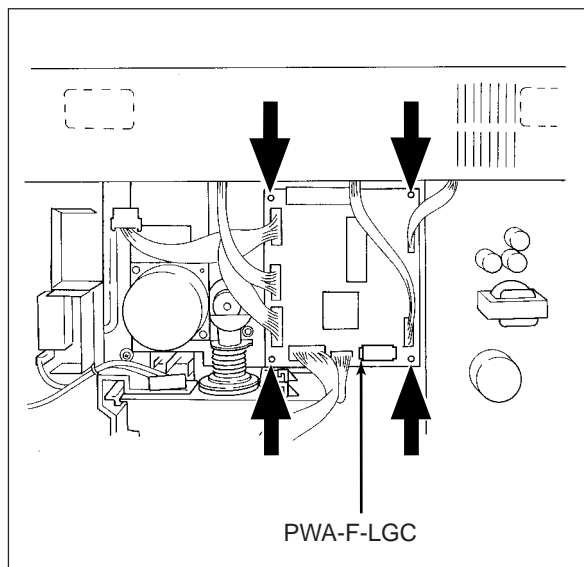
- (1) Remove the control panel cover.
- (2) Place the control panel cover upside down and remove the two screws fastening the bracket.
- (3) Remove one screw.
- (4) Disconnect one connector.

Note: Be careful not to allow the ground wire of the shield to be cut.



[C] Logic PC board (PWA-F-LGC)

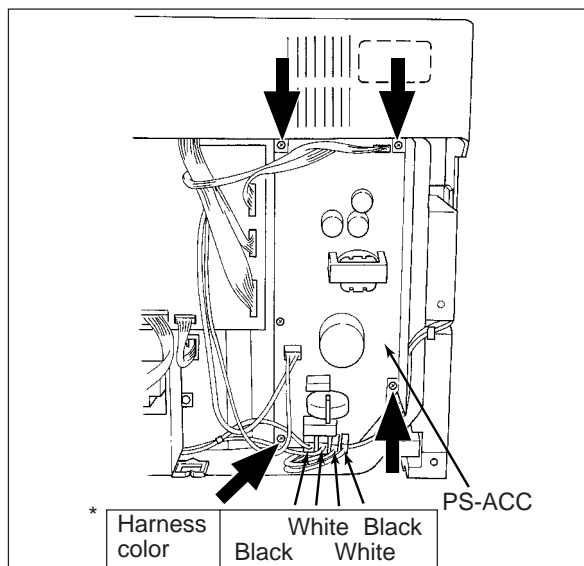
- (1) Remove the rear cover.
- (2) Disconnect connectors (10 pcs. when no optional equipment is used and 11 pcs. when optional equipment are used) and take out the PC board from its four lock supports.



[D] Power supply unit

- (1) Remove the rear cover.
- (2) Disconnect connectors (9 pcs.).
- (3) Remove four screws.

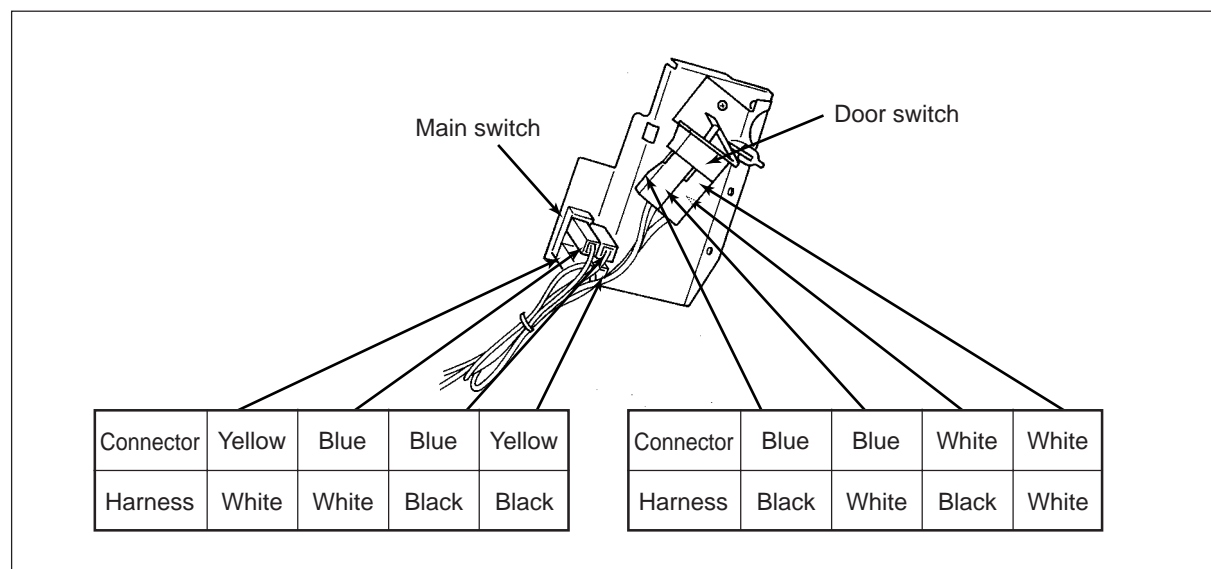
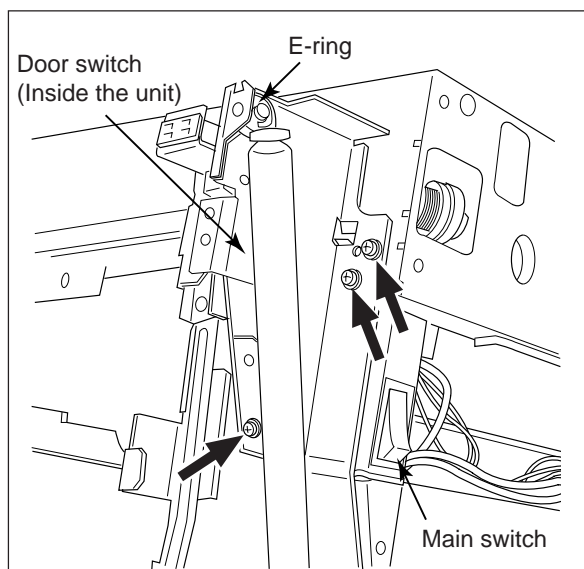
* About bottom 4 connectors, black harness must be connected "L" terminal that is described on PC board and white must be "N".



[E] Door switch and Main switch (power switch)

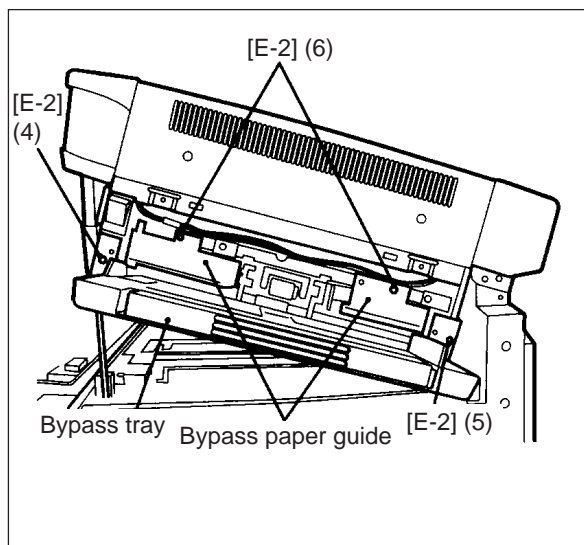
[E-1] 1550

- (1) Remove the inner cover.
- (2) Remove the feed-side cover.
- (3) Remove the right side cover (upper).
- (4) Snap off an E-ring.
- (5) Take out the gas spring.
- (6) Remove three screws and tilt the unit toward you after having shifted it toward the right.
- (7) Removing the respective connectors and screws allows the door switch and the main switch to be removed and replaced. Before replacement, pay attention to the colors of the connectors and the harnesses.



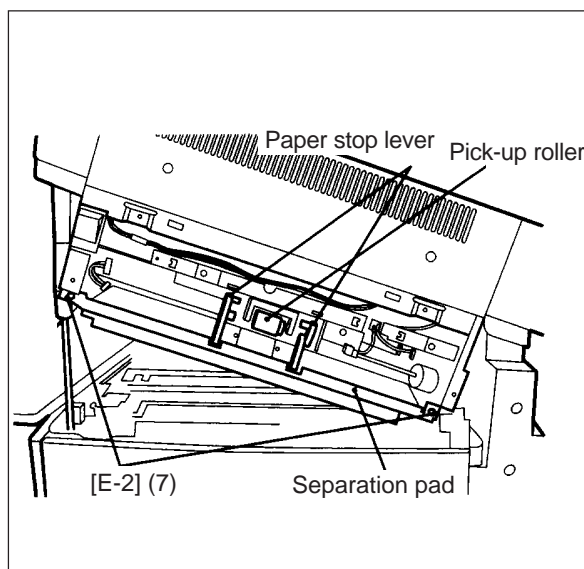
[E-2] 1560

- (1) Remove the rear cover.
- (2) Open the front cover and raise the upper unit.
- (3) Remove the bypass paper-feed cover (2 screws).
- (4) Remove the front support bracket (1 screw) of the bypass and take out the bypass tray.
- (5) Remove the rear support bracket (1 screw).
- (6) Remove the bypass paper guides (upper/2 pieces) (1 screw each).

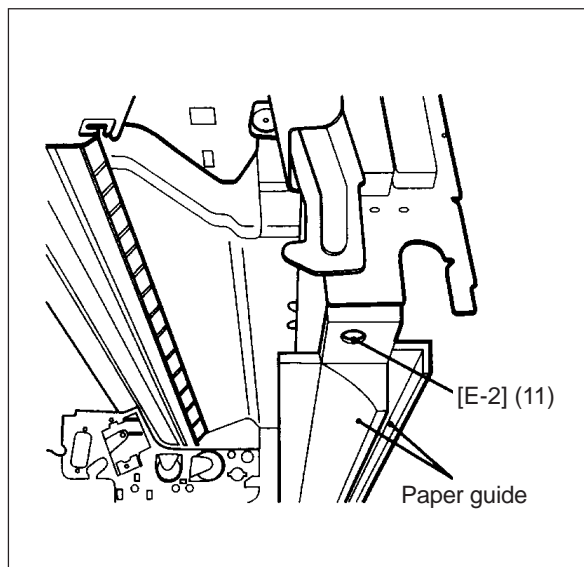


- (7) Remove the 2 screws of the bypass separation pad bracket.
- (8) Push down the pick-up roller and take out the separation pad bracket by pushing down the paper stop lever and the arm of the paper sensor.

For the removal of the bypass paper feed roller, the separation pad and the clutch, details are given later.

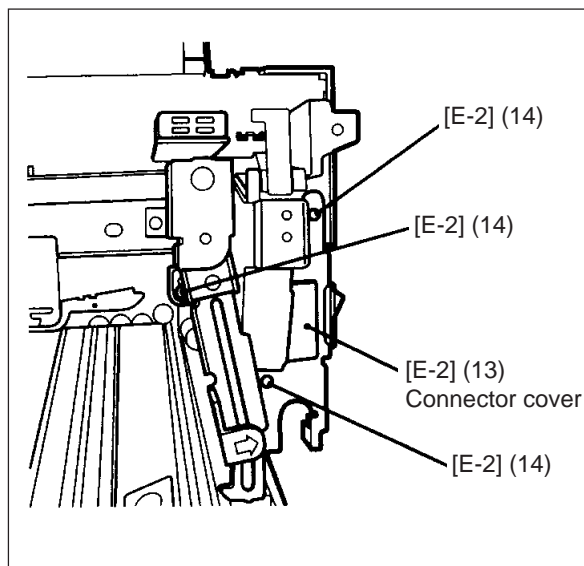


- (9) Remove the process unit, inner cover (upper) and the control panel.
- (10) Remove the paper-feed side gas spring (E-ring, 1 piece). Then, open the original cover to prevent the upper unit from falling down.
- (11) Remove 1 screw of the paper guide and pull it out toward the front. (two paper guides can be removed at the same time.)
- (12) Remove the right cover.
- (13) Remove the connector cover of the switch.

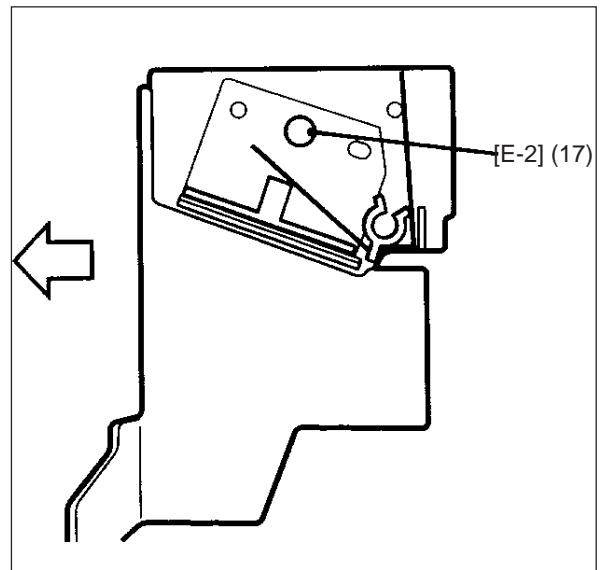


- (14) Remove the 3 screws of the bracket fixing the switch.
- (15) Pull the bracket out with the harness connected.

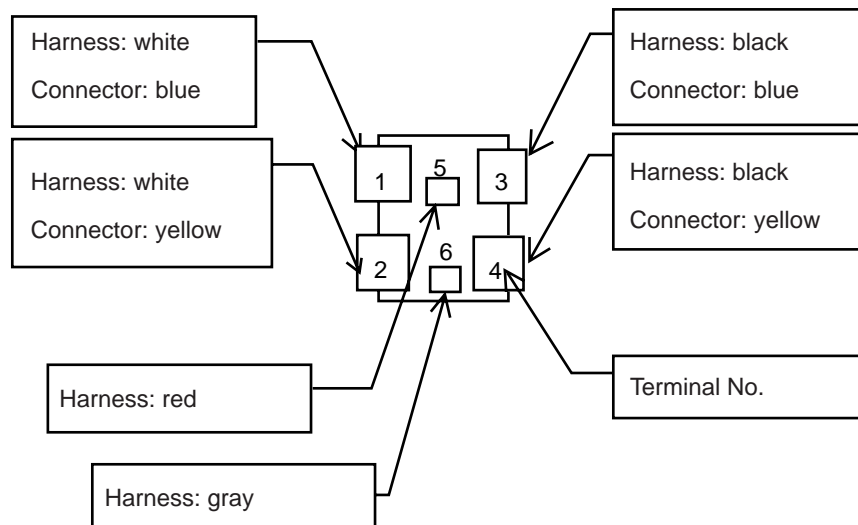
< For removing the lens motor, details are given later. >



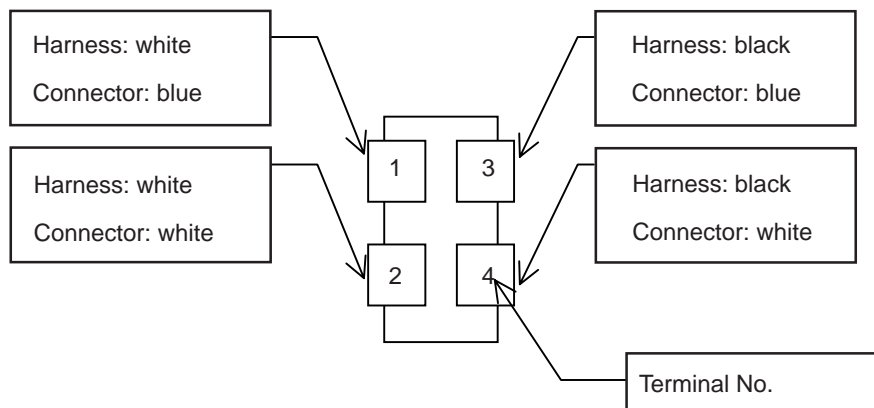
- (16) Take out the main switch connector and remove the switch while pushing the switch pawl.
- (17) Take out the door switch bracket (1 screw) and remove the bracket in the direction of the arrow.
- (18) Take out the switch connector and remove the switch while pushing the switch pawl. When reassembling, take care with the contacting of the connector.



Main switch connector connecting diagram.

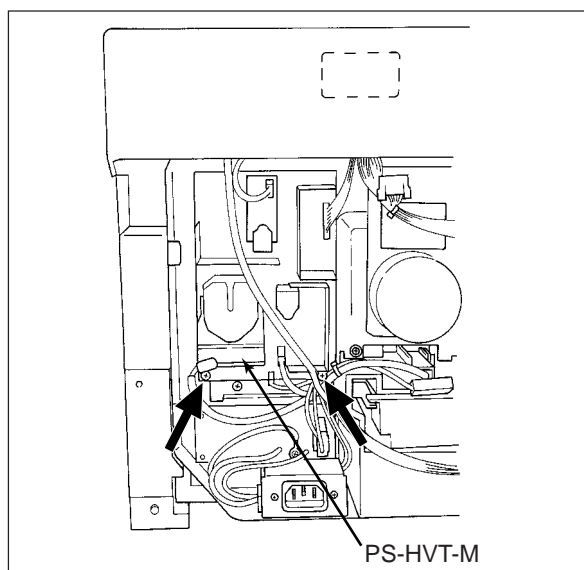


Door switch connector connecting diagram.



[F] High-voltage transformer for the main charger (PS-HVT-M)

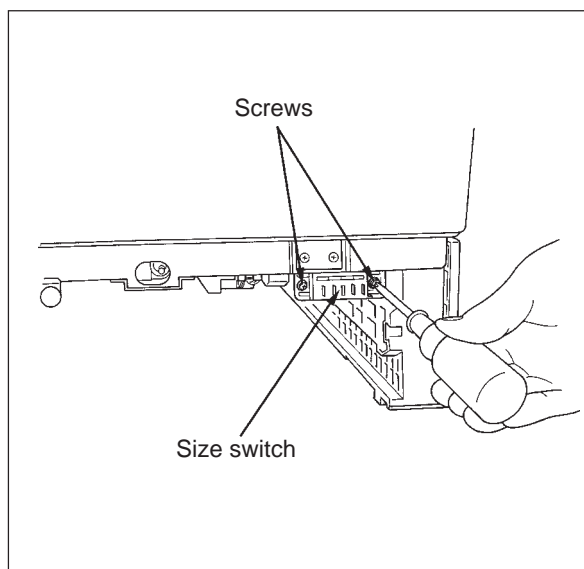
- (1) Remove the rear cover.
- (2) Disconnect seven (7) connectors.
- (3) Remove two screws.
- (4) Remove two lock supports.



[G] Size switch

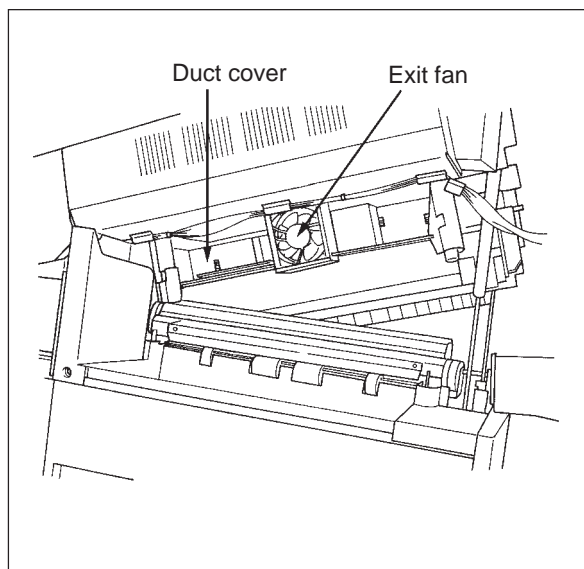
- (1) Pull out the cassette.
- (2) Remove two screws.
- (3) Disconnect one connector.

Note: The left screw is tightened with the protective cover on the corner of the switch.



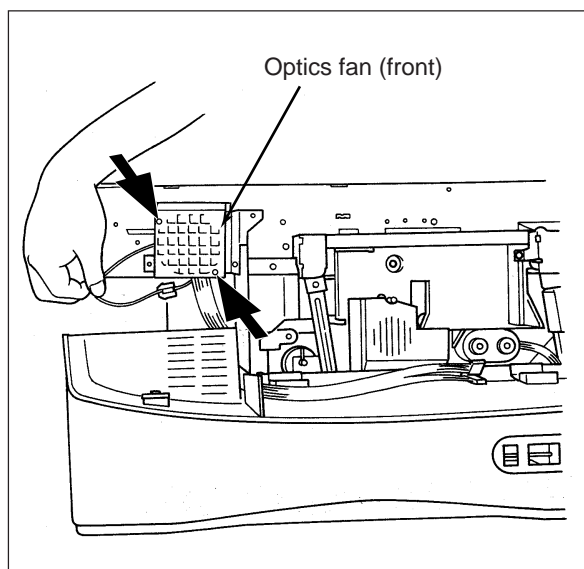
[H] Exit fan

- (1) Remove the left-side cover (upper) (1 screw).
- (2) Disconnect three connectors (front).
- (3) Remove the duct cover (1 screw).
- (4) Separate the exit fan from the cover (1 connector).



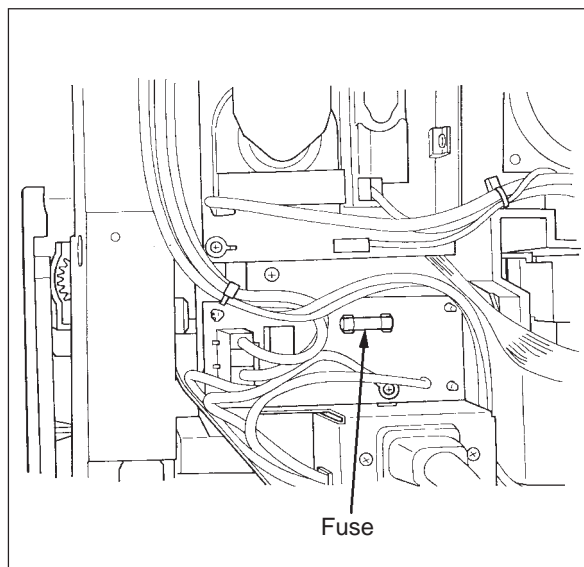
[I] Front optics fan (front)

- (1) Remove the inner cover.
- (2) Disconnect one connector.
- (3) Remove two screws.



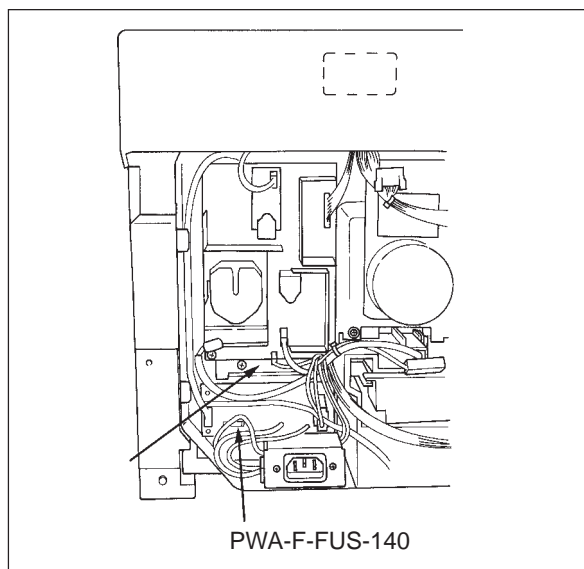
[J] Fuse (PWA-F-FUS-140)

- (1) Remove the rear cover.
- (2) Replace the fuse.



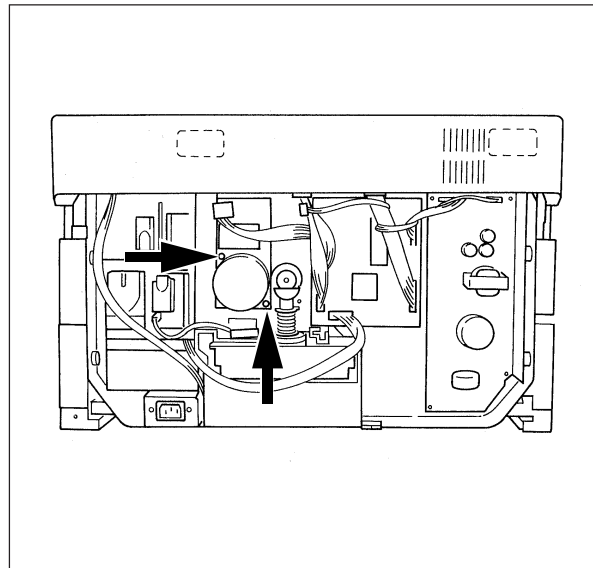
[K] Fuse PC board (PWA-F-FUS-140)

- (1) Disconnect one connector.
- (2) Remove one screw.
- (3) Remove the fuse PC board with the bracket.



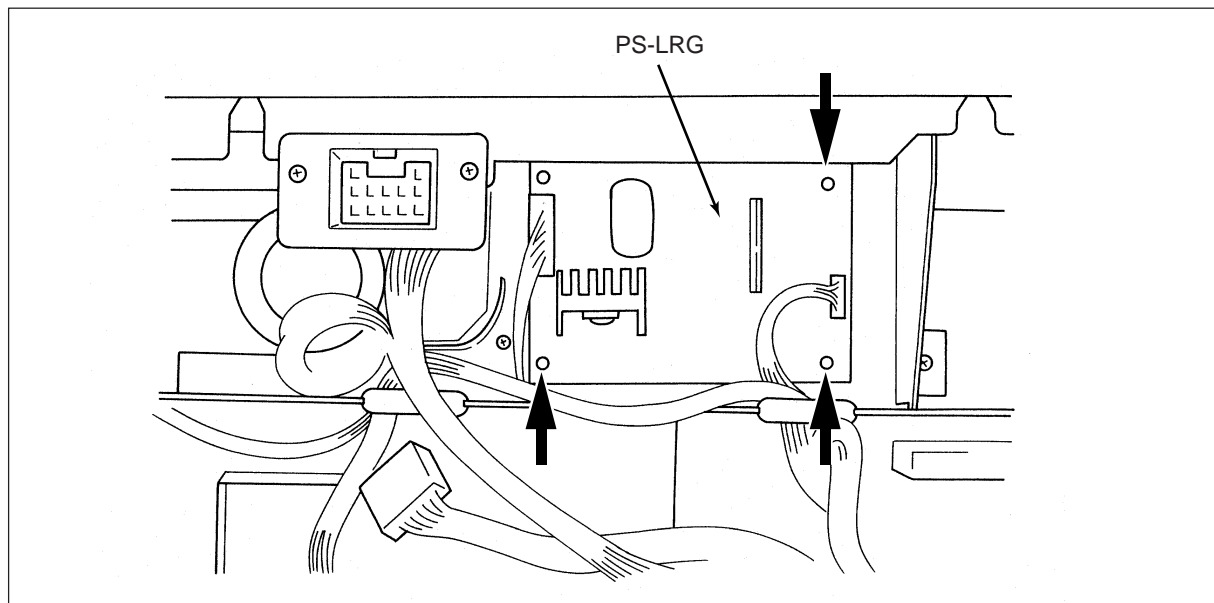
[L] Main motor

- (1) Disconnect two connectors.
- (2) Remove two screws.



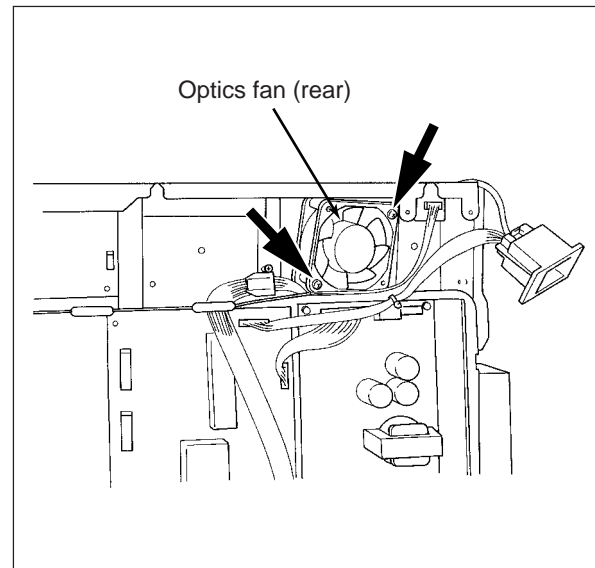
[M] Lamp regulator PC board (PS-LRG)

- (1) Remove the top cover.
- (2) Disconnect two connectors and remove the PC board from three lock supports.



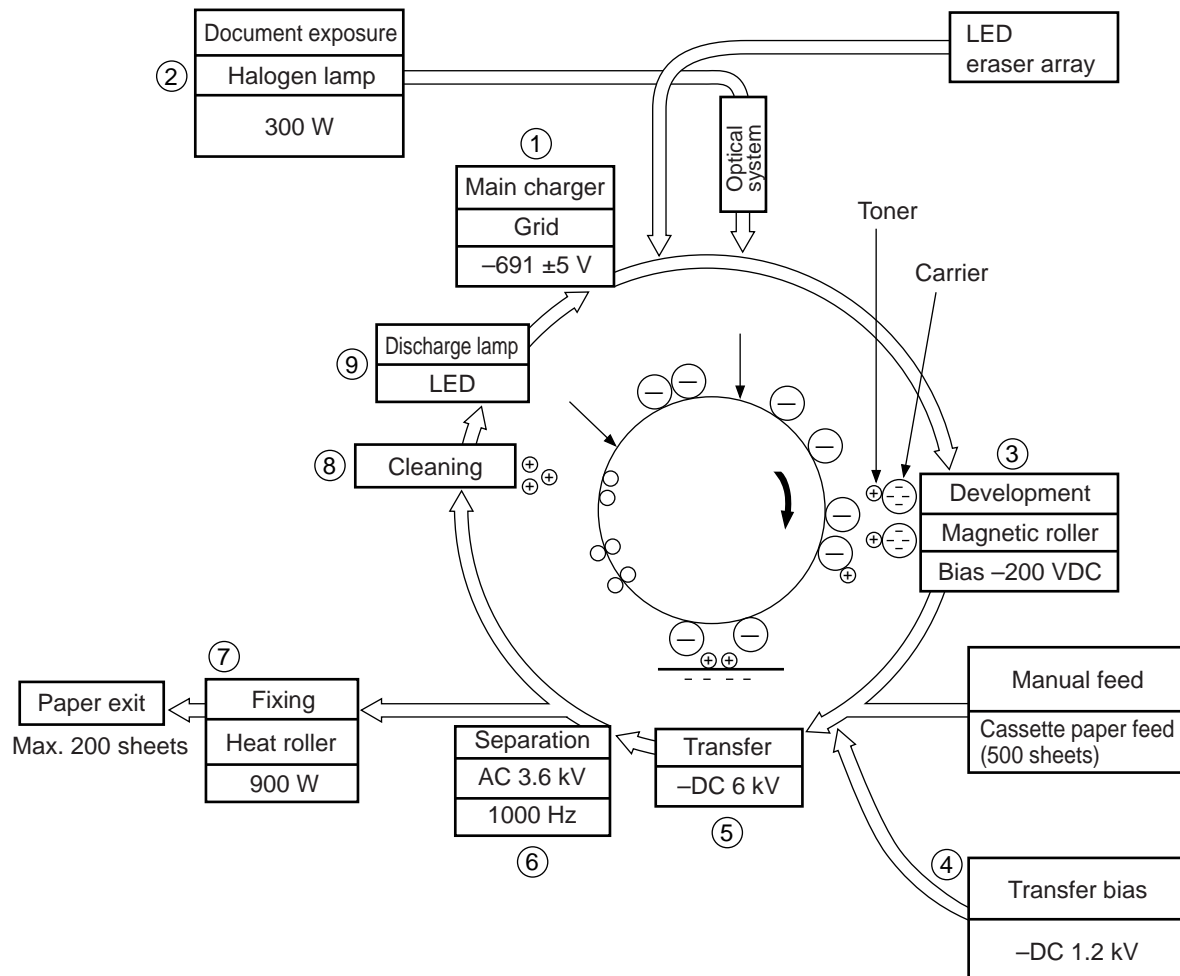
[N] Optics fan (rear)

- (1) Remove the top cover.
Remove the connector from the sorter (two screws).
- (2) Disconnect one connector.
- (3) Remove two screws.



3. COPYING PROCESS

3.1 Copying Process



- ① Main charger : A negative electrostatic charge is placed on the photoconductive (photosensitive) surface of the drum.
- ② Exposure : Forms an electrostatic latent image on the photoconductive surface of the drum.
- ③ Development : Positively charged toner is attracted to the photoconductive surface of the drum to form a visible image.
- ④ Transfer bias : Raises transfer efficiency.
- ⑤ Transfer : Transfers the visible toner image from the surface of the drum to the copy paper.
- ⑥ Separation : The copy paper is separated from the surface of the drum together with the toner image.
- ⑦ Fixing : The toner image is fixed to the copy paper by heat and pressure.
- ⑧ Cleaning : Any toner remaining on the photoconductive surface of the drum is mechanically removed by the cleaning blade.
- ⑨ Discharging : Erases the electrostatic charge remaining on the photoconductive surface of the drum.

3.2 ED-1550/1560 Copying Process

Process	1550/1560
1. Drum	OD-1550 (OPC ø60)
(1) Sensitivity	Highly sensitized drum
(2) Surface potential	DC-700V Scolotron system
2. Charging	Variable output
3. Exposure	
(1) Light control	Automatic exposure/manual step setting
(2) Light source	300W halogen lamp stabilized with regulator (light intensity remains constant even when voltage varies)
4. Development	
(1) Magnetic roller	One magnetic roller (with two shaft mixers)
(2) Auto-toner	Magnetic bridge-circuit system
(3) Toner replenishment	Toner cartridge system
(4) Toner-empty sensor	Intensity sensing system
(5) Toner	T-1550 or T-1550E
(6) Developing material	D-1550
(7) Developer bias	DC-200V
5. Transfer	Adjustable output (fixed current)
6. Separation	Adjustable output (independently adjustable)
7. Discharge	
(1) Discharging position	After cleaning
(2) Discharge lamp	LED type
8. Cleaning	
(1) System	Blade system
(2) Recovery of toner	Non-reusable

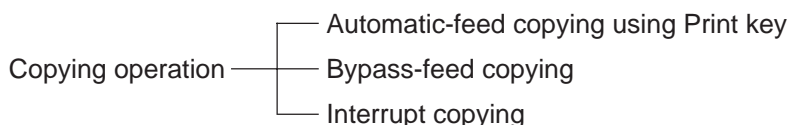
Process	1550/1560
9. Fixing	
(1) Type	Heat roller system
• Fixing	• Fixing roller: Teflon coated roller
• Pressure	• Pressure roller: PFA tube silicon roller (ø28)
• Lamp rating	• 900W (infrared heat)
(2) Cleaning	Cleaning with silicon impregnated roller
(3) Heater temperature control	ON/OFF control by thermistor
10. Control	Microcomputer

4. COPIER OPERATION

4.1 Operation Outline

Copier operation

Operation during warm up and standby



4.2 Description of Operation

4.2.1 During warm up

- (1) Copy quantity indicator shows "0" and print-key lights up "red" lamp.

Heater lamp comes ON.

Initial position setting for the optical system ~ moves the lens and the mirror to actual-size position.

Exit fan (M8) stops and optical fans (M6/M7) stop.

- (2) When the heat-roller temperature is sufficient for fixing:

The heater lamp goes OFF.

The copy quantity indicator shows "1", and the print key changes to "green" lamp.

(Paper jam release cover to be closed when there is paper in the cassette.)

Exit fan (M8) starts rotating at low speed and optical fans (M6/M7) stop.

4.2.2 Standby (ready) condition

All keys on the control panel are operable.

When there is no other key entry for a predetermined period, the machine is set automatically to a copy quantity of "1", a reproduction ratio of 100% and automatic exposure.

4.2.3 Cassette feed copying using the print key

- (1) Print key ON

Print key display changes from "green" to "red".

Main charger, transfer charger, separation charger, transfer bias, discharge lamp and LED eraser array come ON and optical fans (M6/M7) rotate at high speed. Exit fan (M8) starts rotating at high speed.

Main motor (M1) comes ON.

~ Drum, developer, heat roller and paper-exit roller rotate.

- (2) Paper feeding from cassette

The feed roller clutch (CLT2) and the pick-up roller clutch (CLT3) come ON.

~ The pick-up roller and paper feed roller rotate.

After a pre-defined period the pick-up roller clutch (CLT3) goes OFF.

Aligning operation

Paper arrives at the aligning roller.

~ Aligning switch (S5) ON

After a pre-defined period feed roller clutch (CLT2) goes OFF.

Paper feeding complete.

(3) Carriage operation

Exposure lamp ON

Carriage 1 and carriage 2 forward operation starts.

~ Scanning motor (M2) ON

At this time, if the toner density of the developer material is lower than the set value, toner replenishment is performed.

~ Toner motor (M9) is turned ON.

(4) When a fixed time has passed since the carriage operation

~ Paper is transported to transfer section, transport is promoted ~ aligning-roller clutch (CLT1) is turned ON, and the copy quantity counted.

(5) Carriage scanning complete

Scanning motor (M2) is turned OFF.

The main charger and the exposure lamp are turned OFF.

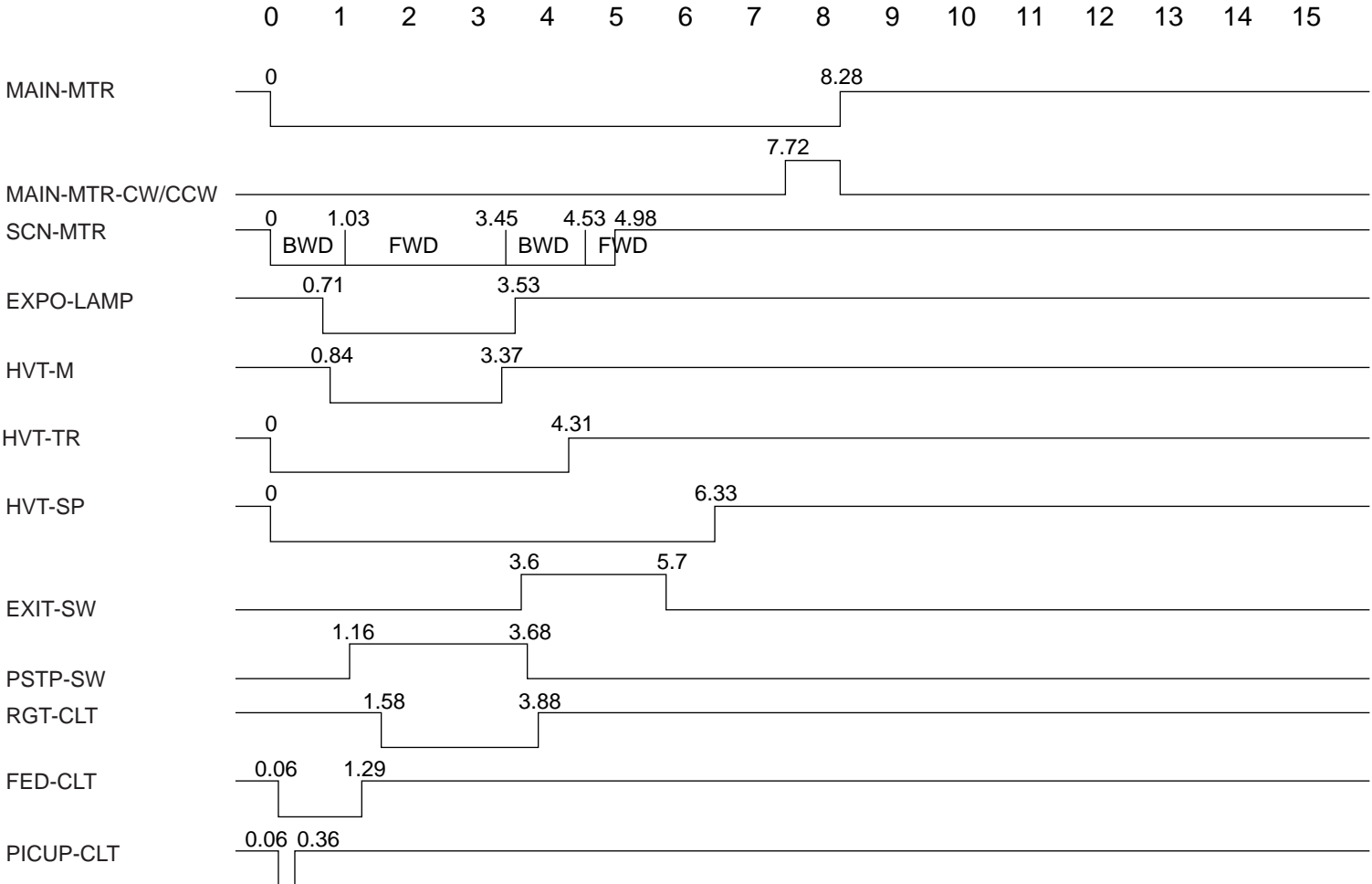
Aligning-roller clutch (CLT1) is turned OFF. (The timing varies according to paper used.)

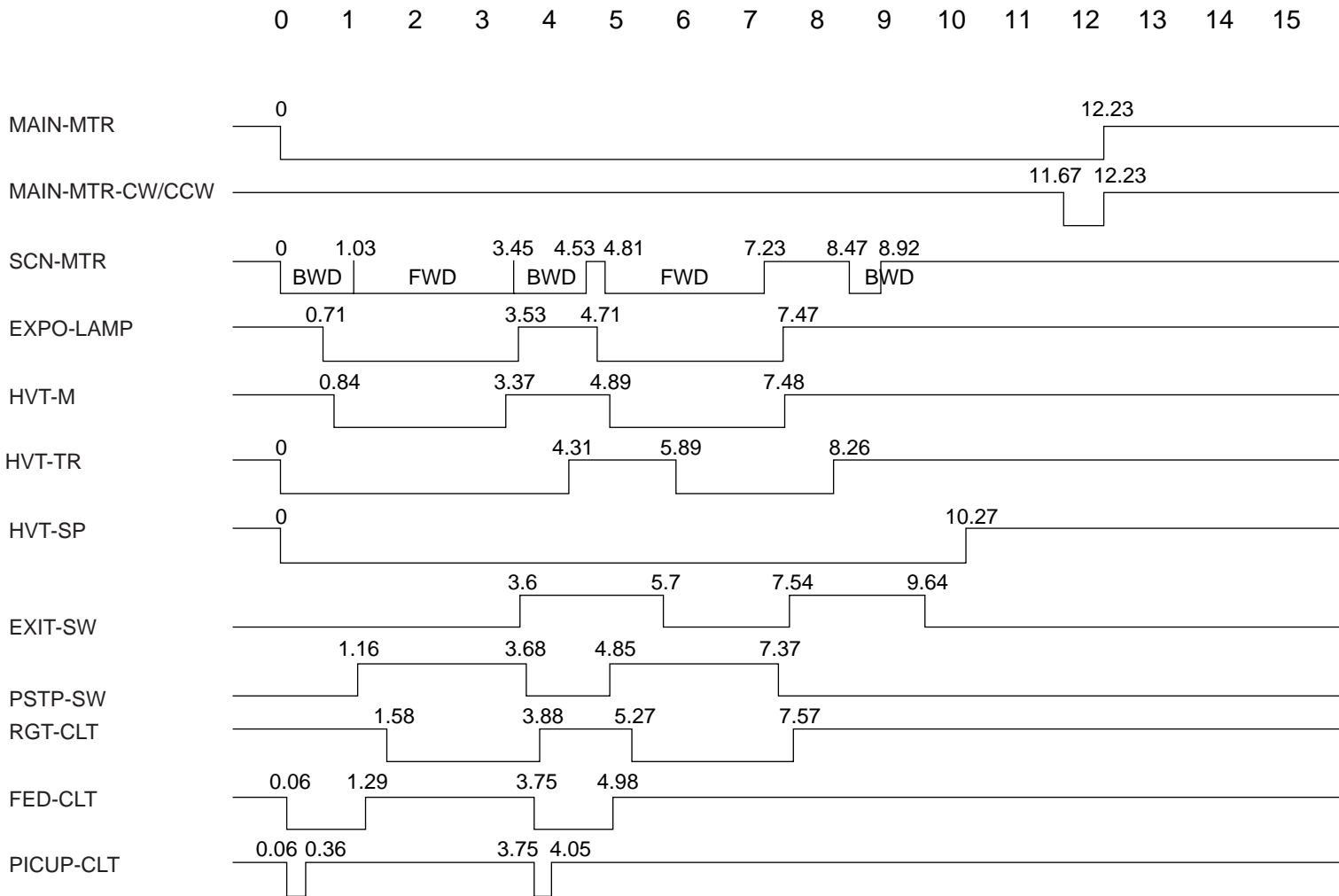
(6) Paper-exit operation

The exit switch (S6) detects the trailing end of the paper passing.

The main motor (M1), transfer charger, separation charger, transfer bias which is turned ON/OFF in accordance with paper feeding, discharge lamp and LED erase array are turned OFF. Optical fans (M6/M7) stop and exit fan (M8) starts rotating at low speed.

Print key: "Green" lamp is turned ON.





4.2.4 Bypass-feed copying

4.2.4.1 1550

- (1) Insert paper in bypass feed guide.
Aligning switch (S5) is turned ON.
~ Bypass-feed indicator lights up
Carriage 1 and carriage 2 move to the home position.
- (2) Print key ON
Main charger, transfer charger, separation charger, transfer bias, discharge lamp and LED eraser array are turned ON.
Optical fans (M6/M7) and exit fan (M8) start rotating at high speed.
Main motor (M1) ON
~ Drum, developer, heat roller and paper-exit roller rotate.
- (3) Subsequently operations for automatic-feed copying (3) ~ (6) are continued by the use of the print key.

4.2.4.2 1560

- (1) Insert the paper in the bypass paper-feed slot.
Switch ON the bypass
The bypass LED of the control panel lights up.
- (2) Press the PRINT key
The main charger/transfer charger/separation charger/transfer bias/discharger lamp/LED eraser lamp are turned ON/and the optical system fan motor rotates at a high speed.
The main motor comes ON~the drum/developert/heat roller/and paper-exit roller rotate.
- (3) Bypass paper-feed operation
The manual feed clutch comes ON~the bypass pick-up roller/paper feed roller rotate.
Aligning operation (the paper reaches the aligning roller)~switch is turned on paper stop.
After a fixed time, the manual feed clutch goes OFF~ paper-feeding is finished.
- (4) Thereafter, the paper-feeding operation is the same as with the cassette.

4.2.5 Interrupt copying

- (1) Press interrupt key.
Interrupt lamp comes ON.
The copier temporarily interrupts the copying operation, and carriage 1 and carriage 2 return to their fixed position.
Automatic exposure goes into the reproduction ratio 100% copy mode. The copy quantity indicator remains unchanged.
- (2) Select desired copying conditions (single-sheet copying only is possible).

(3) After interrupted mode copying has finished.

Press the interrupt key, then the interrupt lamp goes OFF and the conditions prior to interruption are resumed.

(4) Press print key.

Copying operations prior to interruption are resumed.

4.3 Fault Detection

If a fault occurs in the copier, a symbol corresponding to the type of fault will be displayed in order to draw the attention of the operator.

- Classification of faults

A) Faults which can be cleared without turning OFF the door switch (S2)(yellow flashing display on the display panel).

(1) Add paper

(2) Insert key-copy counter

(3) Replace toner bag (This is cleared by replacing the toner bag) (red flashing display)

B) Faults which can not be cleared without turning OFF the door switch (S2) (no display provided on the display panel).

(1) Clear paper

(2) Add toner (yellow flashing display)

C) Faults which can not be cleared without turning OFF the main switch (S1).

(1) Service call

A-1) Add paper (⏏)

- When cassette is inserted in the machine, the paper-empty switch (S3) or (S16) detects the existence of paper ~ When there is no paper, the switch goes OFF.

- When cassette is not inserted in the machine, the paper size switch (S4) or (S18) detects the non-existence of cassettes ~ The paper-size switches all go OFF.



When cassette is not inserted in the machine

When cassette is inserted in the machine but there is no paper.



No-paper state



Signal is sent to control circuit.



"Add Paper" display will flash. ⏏



* Print key will be inoperable.

* Bypass-feed copying is possible if there is paper on the manual feed guide, even when there is no paper in the cassette.

A-2) Bypass misfeed

- During sheet bypass copying
Manual-feed roller clutch (CLT4) goes ON.



Aligning switch (S5) comes ON.

If the aligning switch goes OFF when the aligning-roller starts rotating.



Bypass misfeed



The bypass misfeed symbol is displayed. (8^Λ_V)



Copying cannot be started.

A-3) Insert key-copy counter.

- If the key-copy counter (option) has been inserted in the machine and is withdrawn, "Insert
→ Key Counter" is displayed.

Copying can not be started.

- If the key counter is withdrawn during copying, the machine will stop after the paper being
copied has exited.

B-1) Clear paper (8¹/_V)

- The leading-edge jam is detected by the exit switch (S6): (E01)
The aligning roller clutch (CLT1) is turned ON.

↓ 2.0 sec*

The exit switch (S6) comes ON.

- * When S6 has not come ON after 2.5 seconds have elapsed.

↓

The "Clear Paper" (E01) symbol appears and copying will stop.

- The trailing-edge jam is detected by the exit switch (S6) : (E02). Aligning roller clutch (CLT1) is turned OFF.

↓ 2.0 sec*

S6 OFF (detects paper)

- * When S6 has not come OFF after 2.5 seconds have elapsed.

↓

The "Clear Paper" symbol (E02) appears and copying stops.

- Immediately after the power is turned ON.

↓

The aligning switch (S5) and exit switch (S6) detect the paper (ON).

↓

"Clear Paper" symbol (E03)

- The front cover is opened during copying.

↓

"Clear Paper" symbol (no indication)

B-2) Add toner (L⁺/₁)

Toner density has become low.

↓

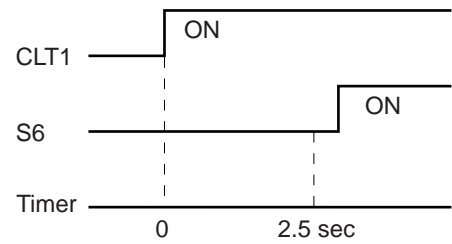
Toner empty signal detection: Auto-toner sensor

↓

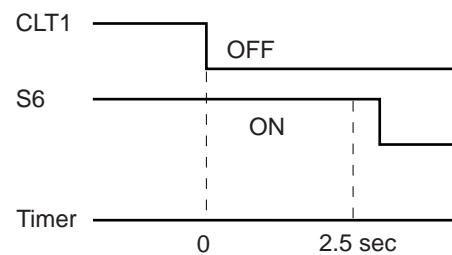
Control circuit: "Add Toner" symbol appears: Copying is not possible.

Clearing method: Replace toner cartridge and close front cover.

Toner supply operation (toner density is resumed at the proper level): Copying is possible.



Clear paper (E01)



Clear paper (E02)

B-3) Replace toner bag (Toner Full)

The toner bag becomes full of toner.



The toner-recovery auger moves towards the front of the machine: Toner-full switch (S10) will be turned ON.



"Replace Toner Bag" symbol is displayed.

- When the toner-full switch (S10) comes ON during copying.



Copying will stop after the last sheet has been exited during copying.

Clearing method: Replace with a new toner bag.

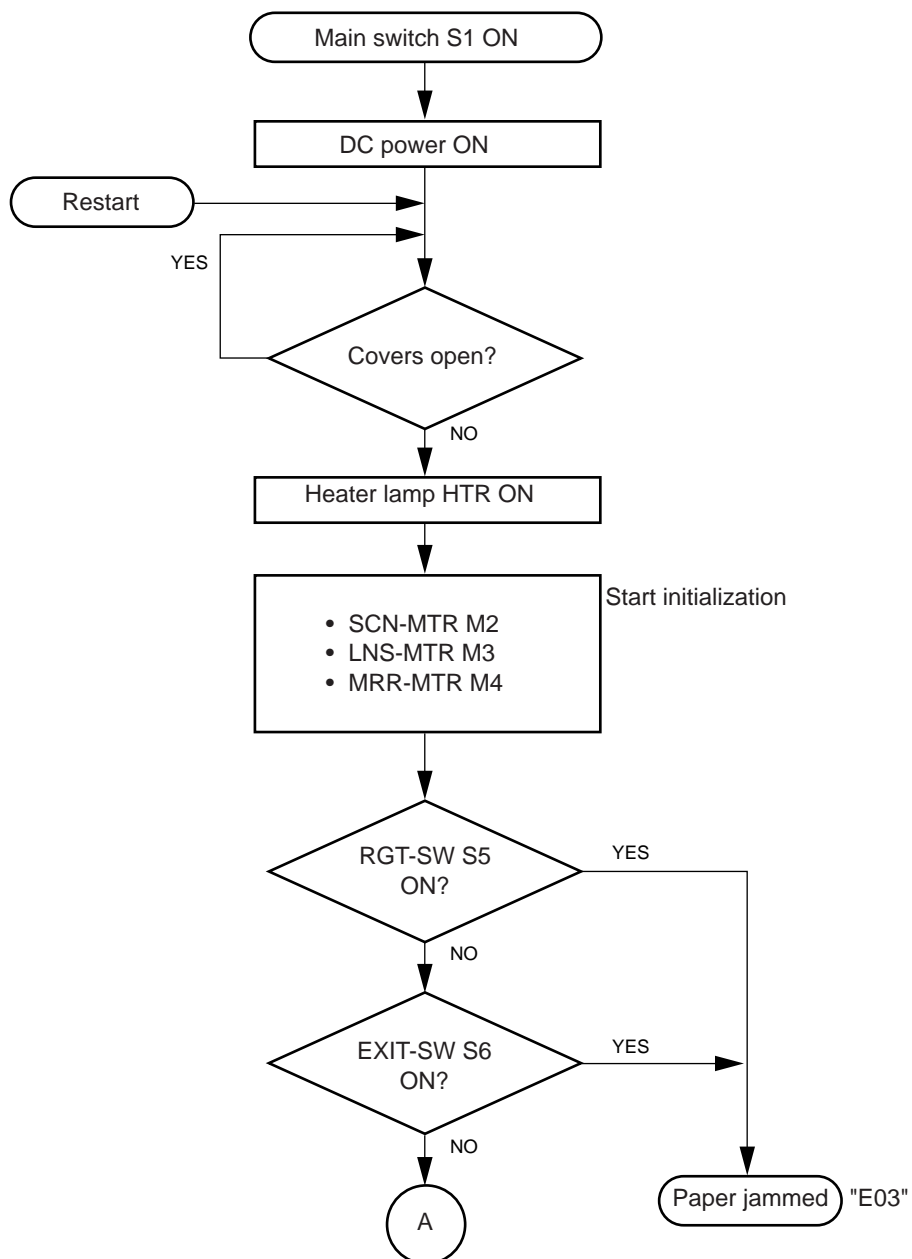
C-1) Service call

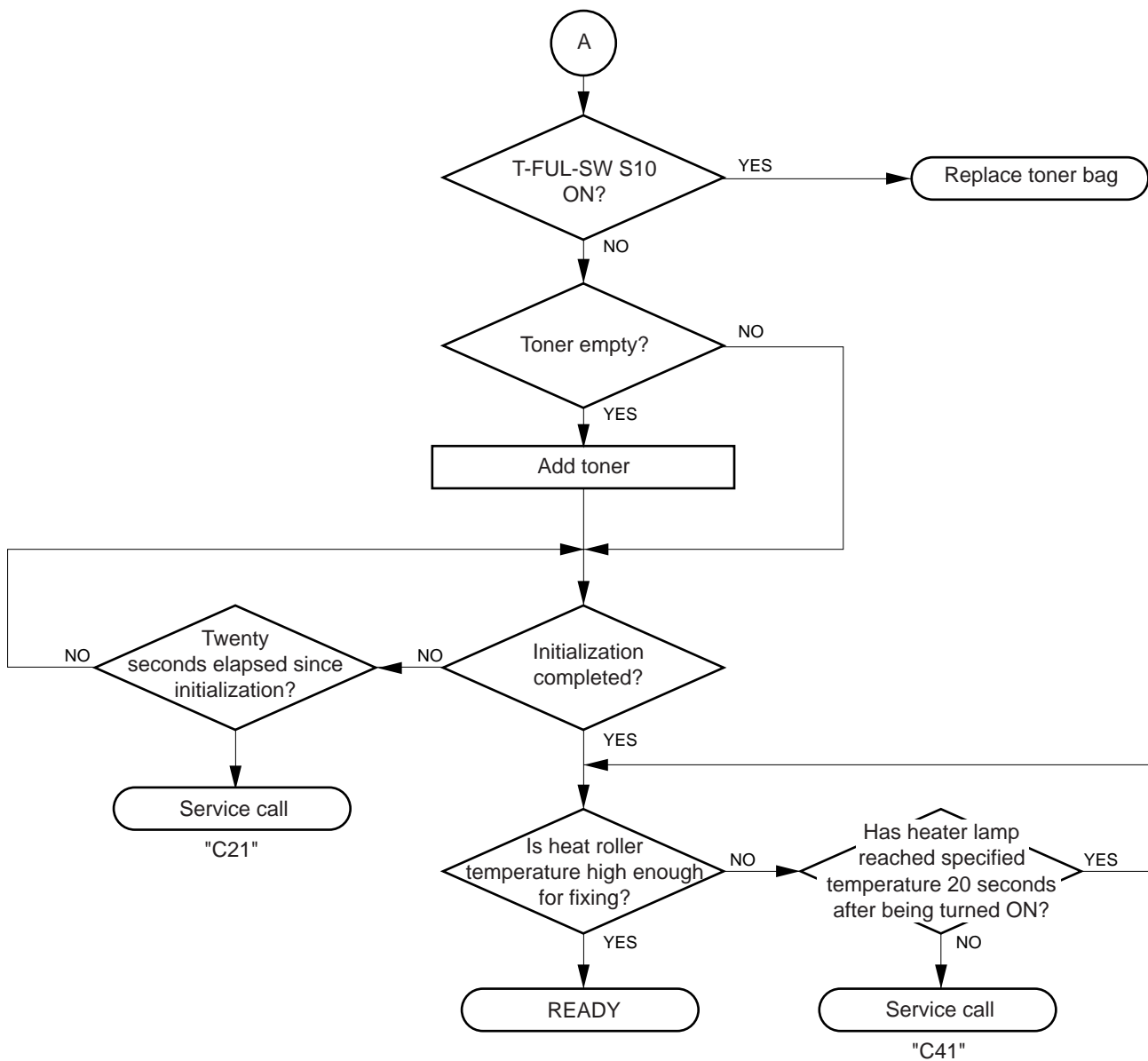
When the "CLEAR/STOP" key and the "8" key are pressed simultaneously while the "Service Call" symbol is flashing, an error code will be indicated in the copy quantity indicator.

For the contents of the error codes, refer to the "SERVICE HANDBOOK".

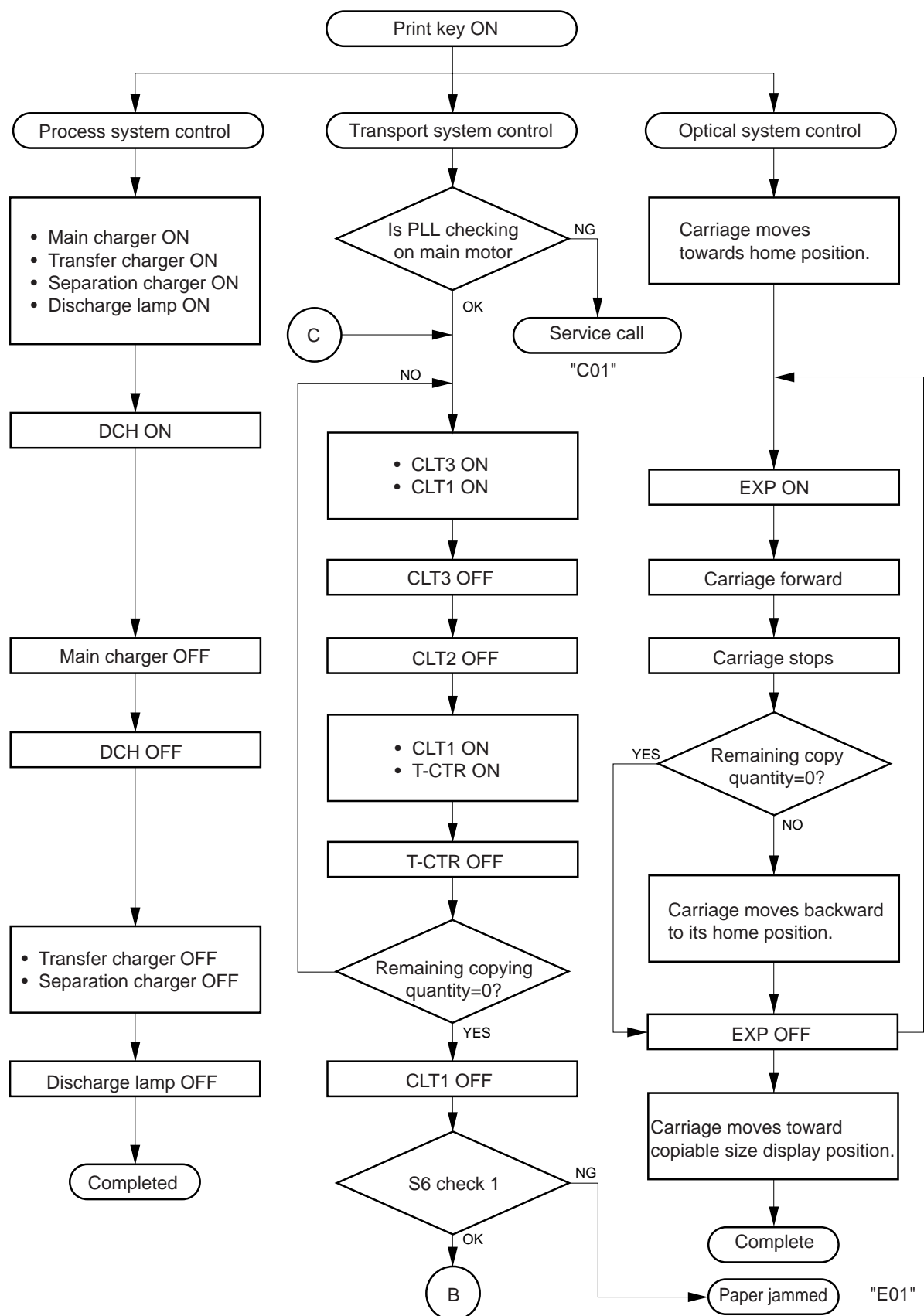
4.4 Flow Charts

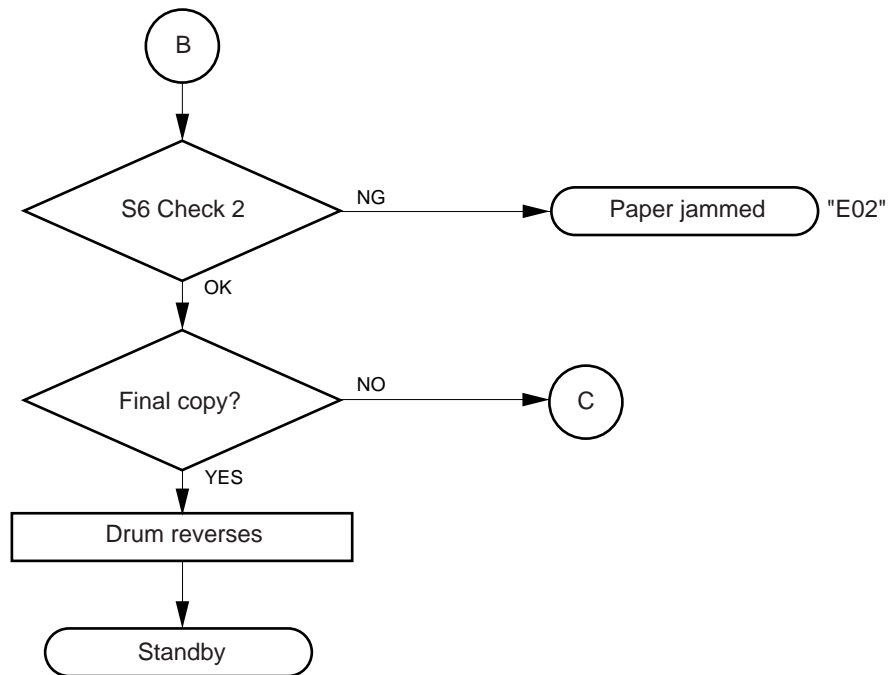
4.4.1 After power supply is turned ON.





4.4.2 Automatic feed copying



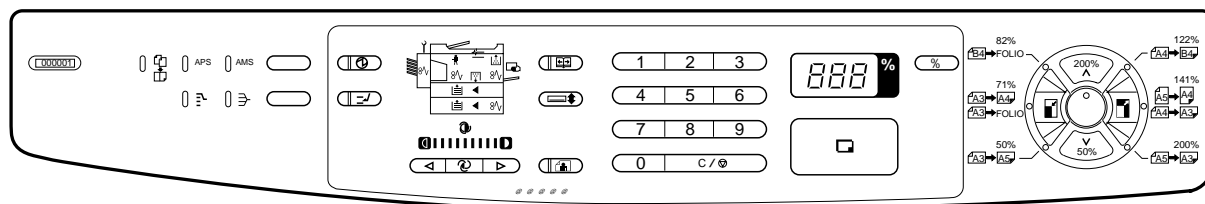


5. DISPLAY UNIT

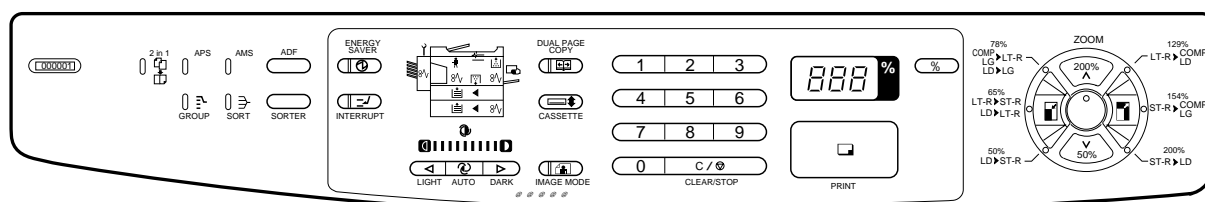
5.1 Control Panel and Indication Panel

The display unit consists of a key switch which operates copying and to select the mode, and an LED which displays machine condition and messages.

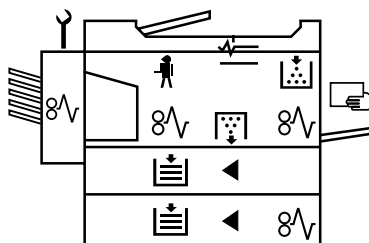
Signs and symbols are turned ON or flash when the attention of the operator needs to be drawn.



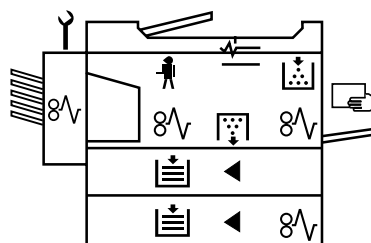
For Europe








For the U.S.A. and Canada



5.2 Items Displayed on Control Panel



- During normal copying operation
 - During warm up When the power switch is turned ON the print key lights up red until capable of copying. The copy quantity and reproduction ratio display show "0".
 - Ready condition When the machine is capable of copying condition, the print key lights up green and the copy quantity and reproduction ratio show "1".
 - While copying When the print key is pressed, the print key lights up red. The copy quantity display displays a countdown and finishes at "1". After completion of copying, the copy quantity indicator returns to the initially set number.
- If a fault occurs (copying is not possible)

"  " flashes	The symbol is displayed when the cassette selected has no paper (including "Insert Cassette"). Bypass feeding is possible.
"  " flashes	The symbol is displayed when the toner in the toner cartridge runs out.
PRINT key flashes in red	The key flashes in red to indicate that the key-copy counter has been withdrawn when the optional key-copy counter is installed.
"  " flashes	The symbol is displayed when the toner bag is full.
"8V" flashes	When the paper is jammed, the position is indicated ① Paper feed, ② Exit-paper area, ③ Paper feeding unit (option) ④ Sorter (option), ⑤ DF (option)
"  " flashes	The symbol is displayed when a malfunction requiring service has occurred.
"  " flashes	The symbol is displayed at the periodic maintenance cycle. (When the PM counter has exceeded the PM set value.) (Capable of copying.)

5.3 Relationship between Machine Condition and Operator's Action

Operation Condition	PRINT key	CLEAR/ STOP key	Digital keys	REPRO- DUCTION- RATIO selection key	AUTO EXPOSURE key (PHOTO key)	Manual exposure	Photo exposure	CASSETTE SELECTION key	INTER- RUPT key	ENERGY SAVER key	DUAL- PAGE COPY key	Sheet bypass
Warming up	○	○	○	○	○	○	○	○	○	○	○	○
Ready	○	○	○	○	○	○	○	○	○	○	○	○
Reproduction-ratio changing	—	○	○	○	○	○	○	○	○	○	○	○
Copying	—	○	—	—	○	○	—	○	○	—	—	× (4)
Add paper	—	○	○	○	○	○	○	○	○	○	○	○
Add toner	—	○	○	○	○	○	○	○	○	○	○	○
Key copy counter not inserted (optional)	—	○	○	○	○	○	○	○	○	○	○	○
Bypass misfeed	—	○	○	○	○	—	—	○	○	○	○	—
Replace toner bag	—	—	○	○	○	○	○	○	○	○	○	○
Clear paper	—	—	—	—	—	—	—	—	—	—	—	—
Service call	—	—	—	—	—	—	—	—	—	—	—	—
Interrupt mode	○	—	—	○	○	○	○	○	○	—	—	○
Energy-saving mode	○	—	—	—	—	—	—	—	—	○	—	—

○: Machine operates or indicates in accordance with the operator's action. —: Operation is ignored.

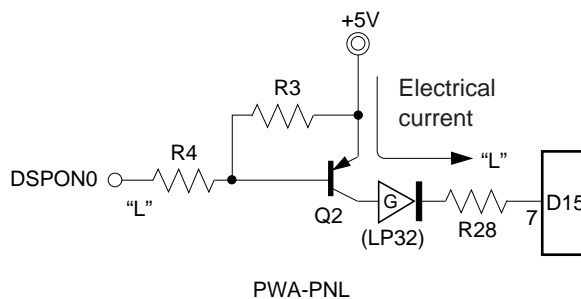
- (1) By pressing the ENERGY SAVER key or the PRINT key, the energy-saving mode will be cancelled.
- (2) During copying, avoid changing exposure as far as possible.
- (3) The function of the CLEAR/STOP key changes in the following manner according to the machine status.
During copying Interruption of the copying (Stop function The copy quantity indicator will not change.)
When not copying When pressed once, the copy quantity indicator returns to "1".
- (4) During copying, avoid sheet bypass feeding because of possible paper jamming.

(Note) The interrupt mode will be automatically cancelled when the machine is not used for 45 seconds.

5.4 LED Display Circuit

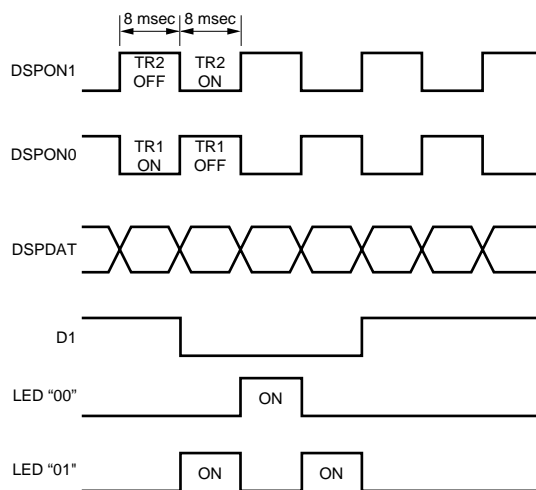
(1) LED display method

Described here is the LED for "dual-page copying" display when "DP" comes ON. When the DSPON0 signal goes to "L" level, transistor Q2 is turned ON. When pin 7 of the IC (D15) goes to "L" level, electrical current flows through the transistor to the LED (DP) from +5V. In other words the LED (DP) comes ON.



(2) The actual circuit is controlled as follows:

- DSPON0 and DSPON1 signal goes to "L" level alternatively for 8 msec.
- Q1 or Q2 goes to the ON condition when the DSPON0 or DSPON1 signal is at "L" level.
- The LED ON/OFF signal from LGC is inputted to the IC SIN (pin 5) terminal via the DSPDAT signal (serial data).
- LED ON/OFF signal is outputted in parallel to D1-D16 output terminal, after being inputted to IC in series.



Conditions for LED to come ON

- ① The transistor (Q1 or Q2) connected on the anode side of LED is ON.
- ② The output connected to the cathode side of the LED is at "L" level.

When ①, ② above are fulfilled, the LED is turned ON.

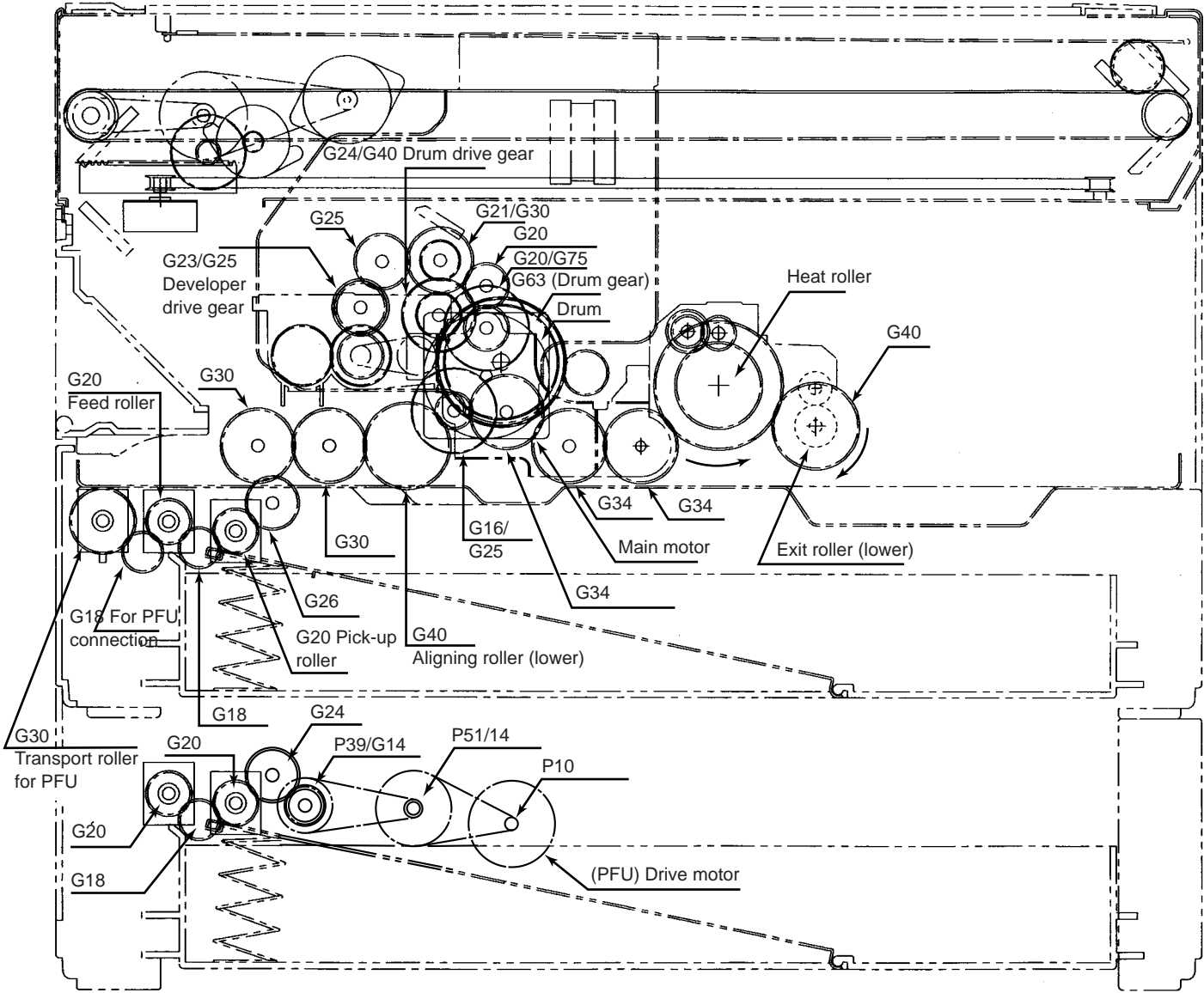
Listed below are the names of LEDs of which ON/OFF is controlled by the DSPON0 signal and the DSPON1 signal.

	DSP-ON0	DSP-ON1
DAT1	2 IN 1	SRV
DAT2	APS	ADFJ
DAT3	AMS	SRTJ
DAT4	GRP	PM
DAT5	SRT	TE
DAT6	PS	MFJ
DAT7	INT	EXTJ
DAT8	EXP1	TF
DAT9	EXP2	FJ1
DAT10	EXP3	PE1
DAT11	EXP4	CS1
DAT12	EXP5	PE2
DAT13	EXP6	CS2
DAT14	EXP7	FJ2
DAT15	EXP8	AUTO
DAT16	EXP9	PHOT
DAT17	MAG2-g	MAG1-g
DAT18	MAG2-b	MAG1-b
DAT19	MAG2-a	MAG1-a
DAT20	MAG2-f	MAG1-f
DAT21	MAG2-e	MAG1-e
DAT22	MAG2-d	MAG1-d
DAT23	MAG2-c	MAG1-c
DAT24	ZM50	MAG3-g
DAT25	ZM71	MAG3-b
DAT26	ZM82	MAG3-a
DAT27	ZM100	MAG3-f
DAT28	ZM122	MAG3-e
DAT29	ZM144	MAG3-d
DAT30	ZM200	MAG3-c
DAT31	DPC	%
DAT32	RDY	WAIT

6 DRIVE MECHANISM

6.1 Construction

The drive mechanism is so constructed as to drive the drum, developer unit, heat rollers (including the cleaning felt roller), paper exit roller and paper feed rollers (copier's and PFU's transport rollers) by means of the main motor.

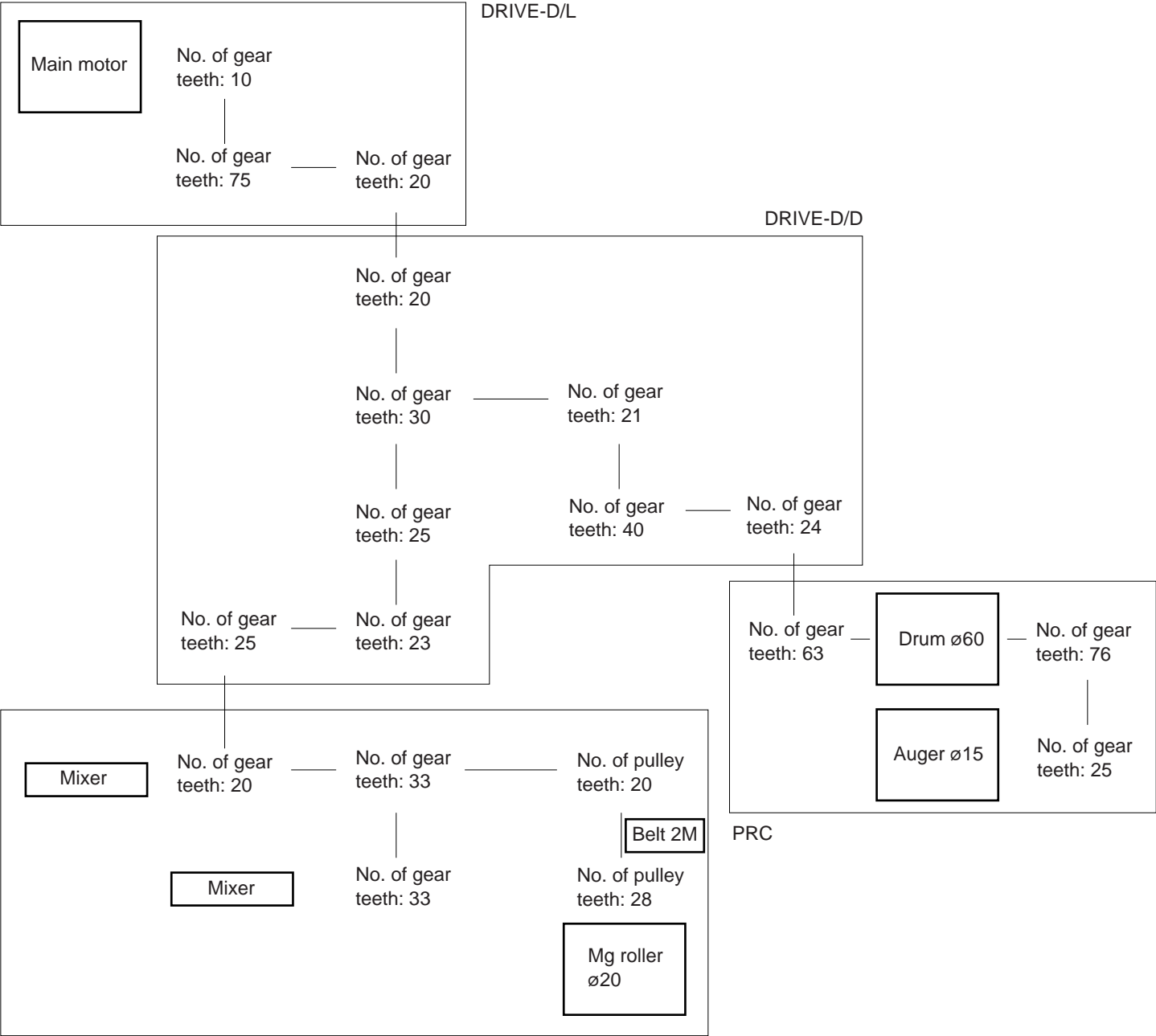


All parts except the main motor are located inside the frames.

Dirve mechanism (as seen from the rear)

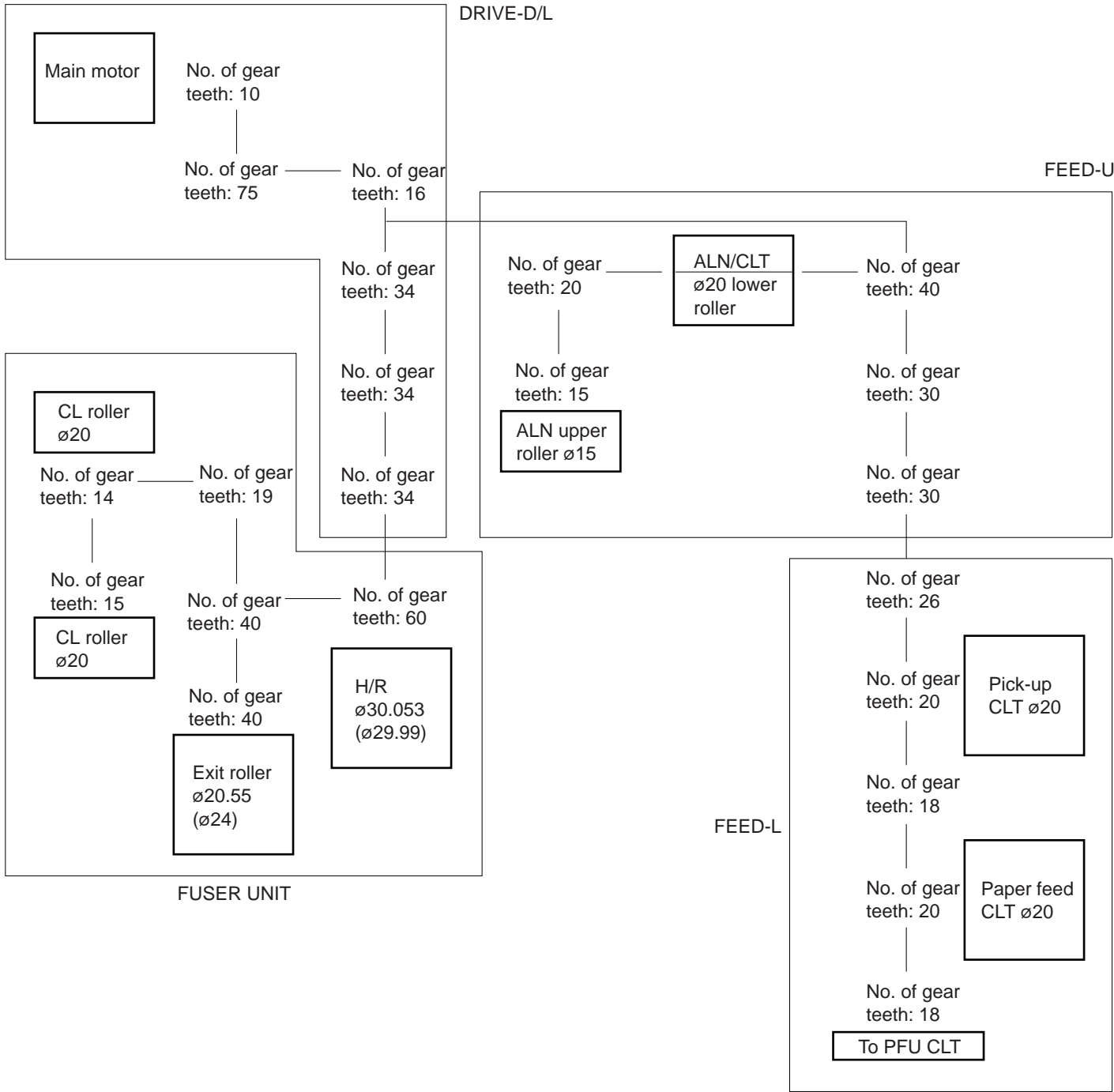
Upper Unit Drive

The horizontal bar (—) indicates the same shaft.



Lower Unit Drive

The horizontal bar (—) indicates the same shaft.



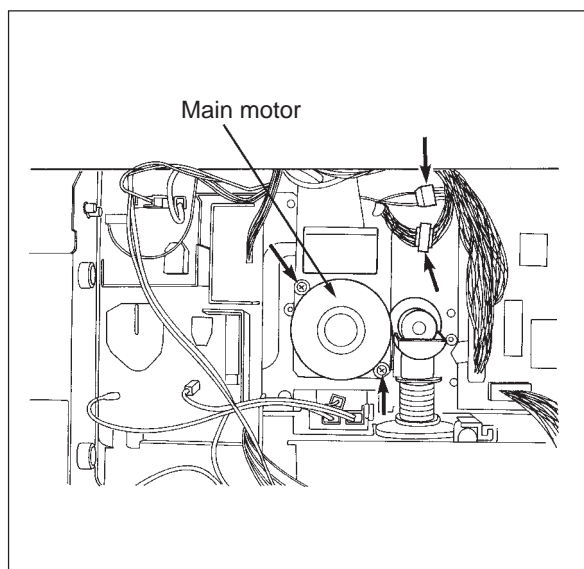
6.2 Explanation of Functions

- Drum drive Transmits the rotation of the main motor to the gears and drum drive gear to drive the drum.
- Developer unit drive Transmits the rotation of the main motor through gears to the developer-unit drive gear to drive the developer unit.
- Heat roller drive Transmits the rotation of the main motor through gears to the heat roller gear to drive the heat roller.
- Exit roller drive Drives the exit roller gear through gears.
- Copier's aligning roller Drives the copier's aligning roller through gears.
- PFU transport roller Drivers the transport roller through the copier's paper feed unit.

6.3 Disassembly and Replacement

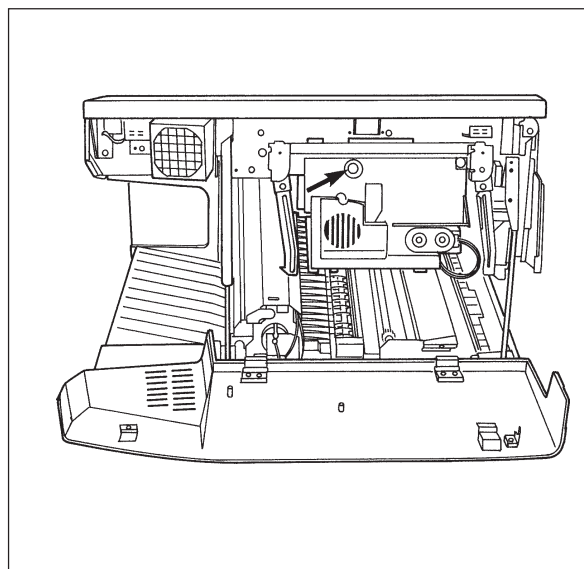
6.3.1 Main motor

- (1) Remove the rear cover.
- (2) Disconnect two connectors.
- (3) Remove two screws.

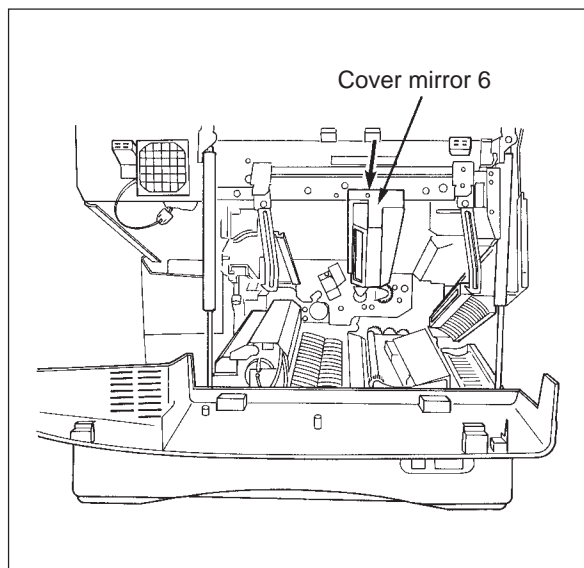


6.3.2 Drum drive gear and developer drive gear

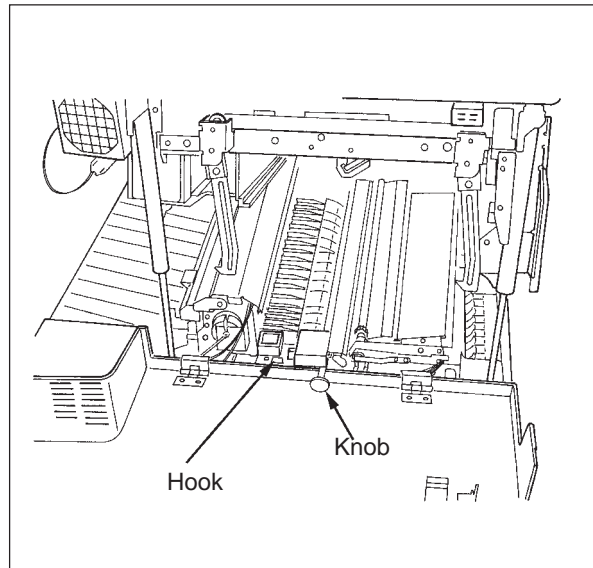
- (1) Remove the process unit (2 screws).



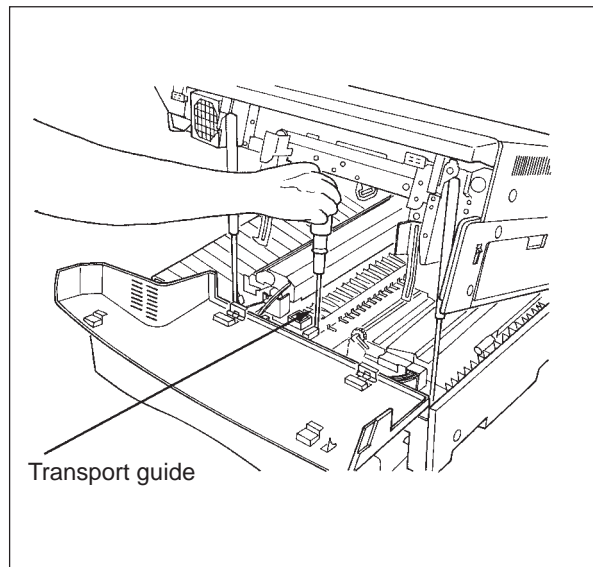
- (2) Remove the cover mirror 6 (1 screw).



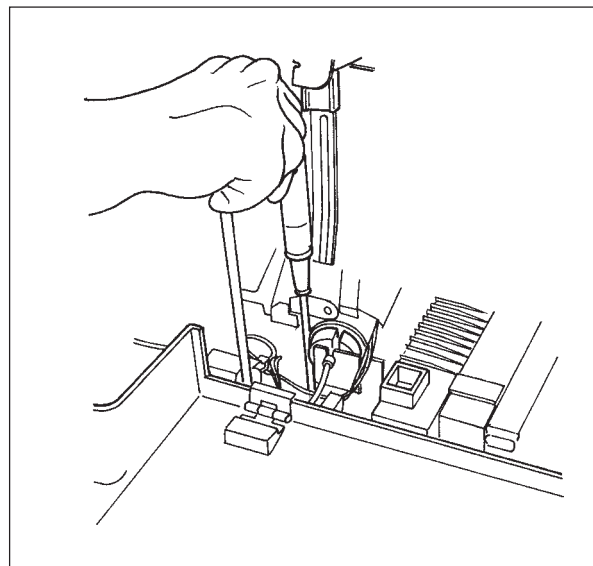
- (3) Remove the transfer/separation charger (Refer to 9.3.6).



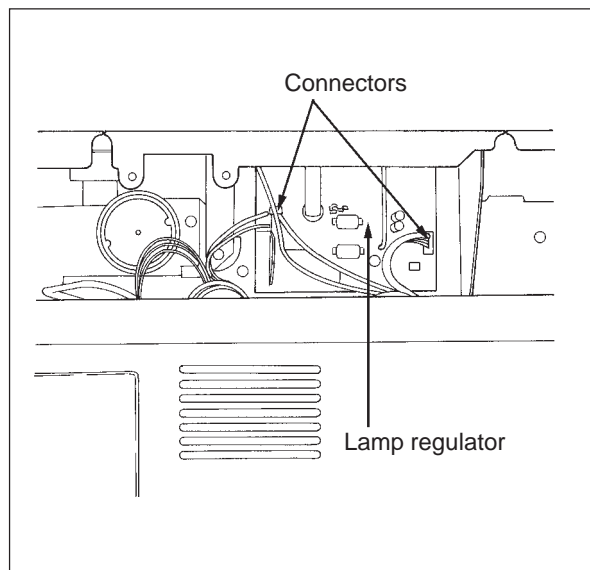
- (4) Remove the transport guide (1 screw and 1 blue connector at the rear).



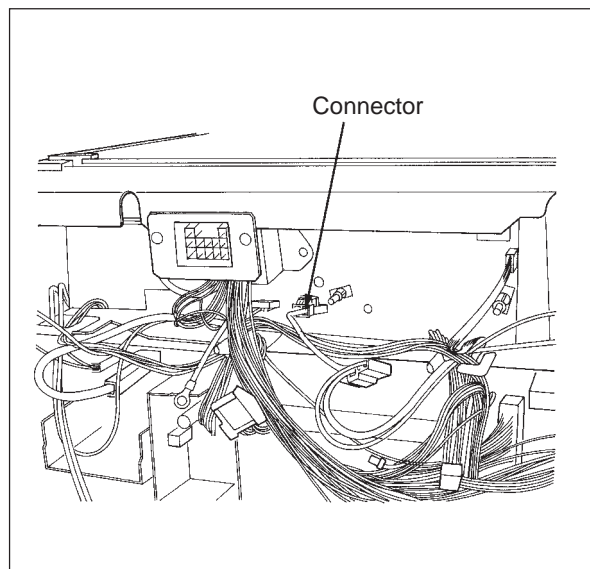
- (5) Remove the inner cover (lower left).
(6) Remove the fuser unit (1 screw).



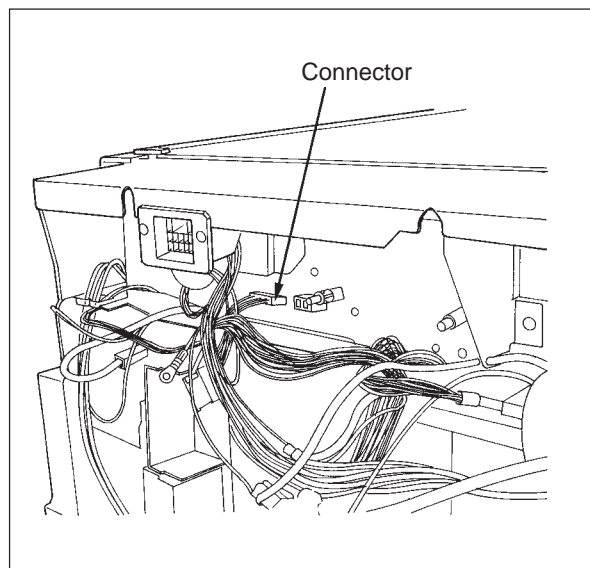
- (7) Remove the lamp regulator (two connectors).



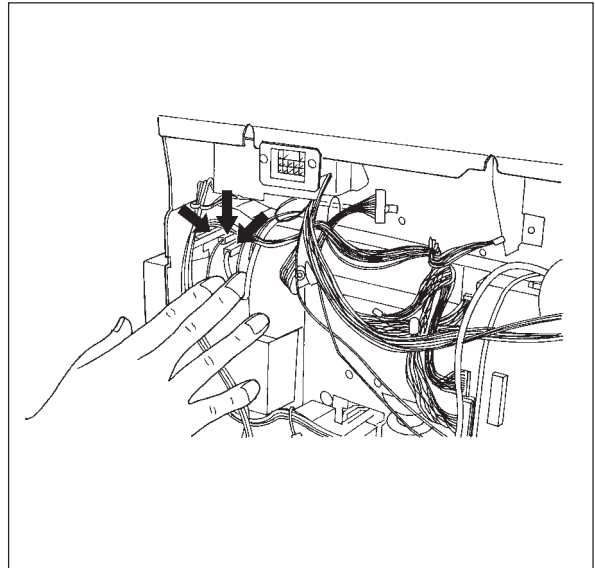
- (8) Remove the exposure lamp and power supply connector.



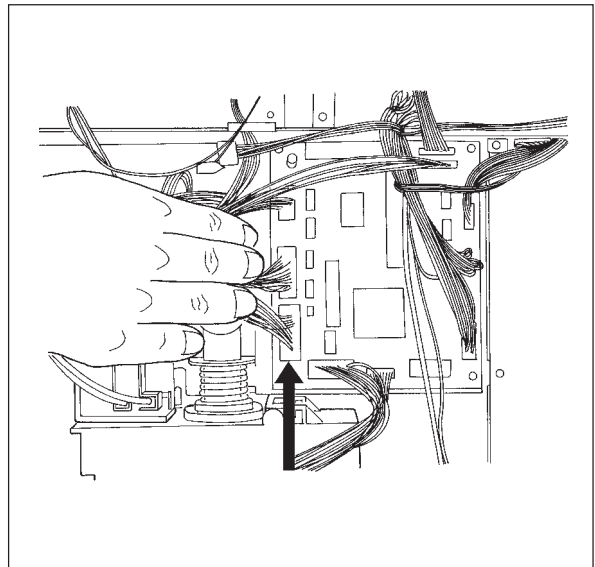
- (9) Disconnect the connector for the auto exposure, lens switch and mirror motor.



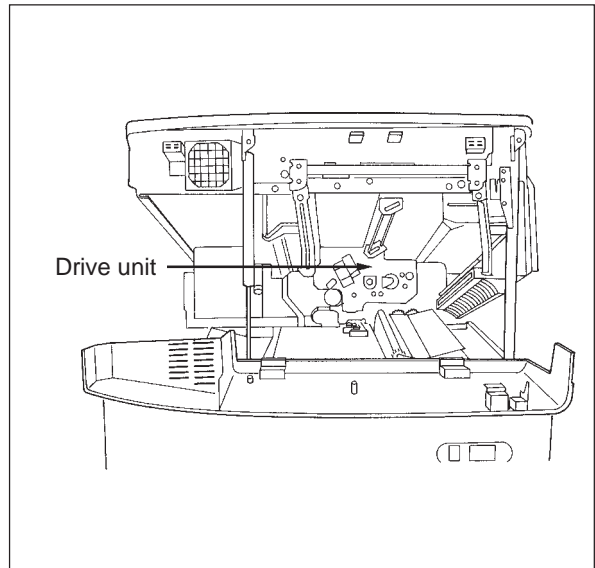
- (10) Pull out the three connectors for the main charger and the bias wire from the high-voltage transformer.



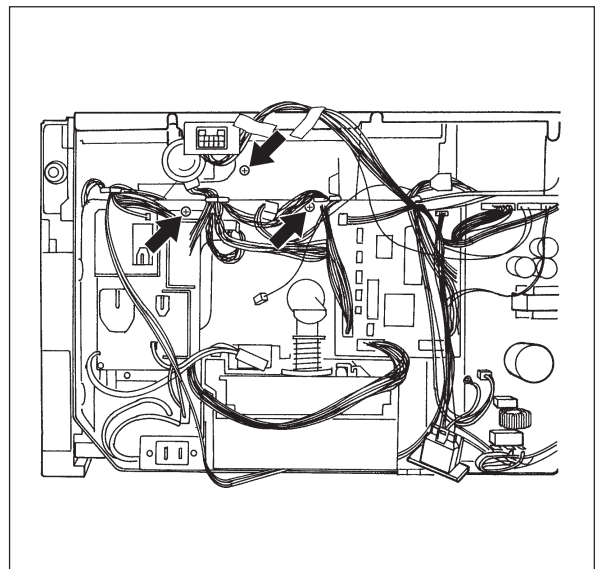
- (11) Disconnect the connector for the process unit.



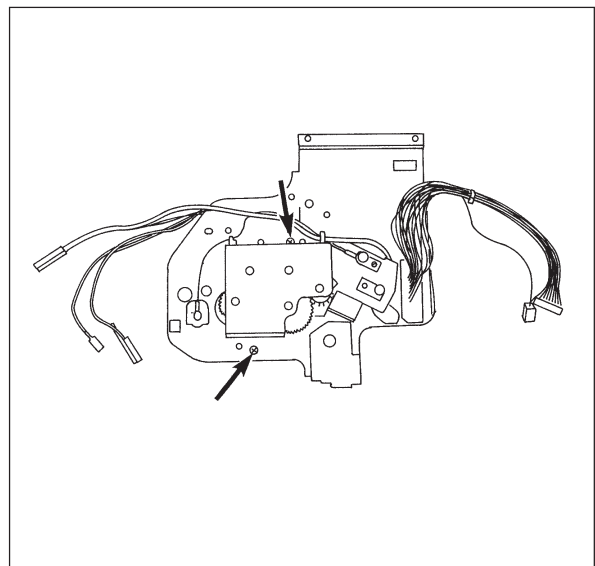
- (12) Remove the drive unit from the rear inside of the machine (3 screws).



- Close the clamshell and remove 2 screws from each of the 2 screw holes on the rear frame.

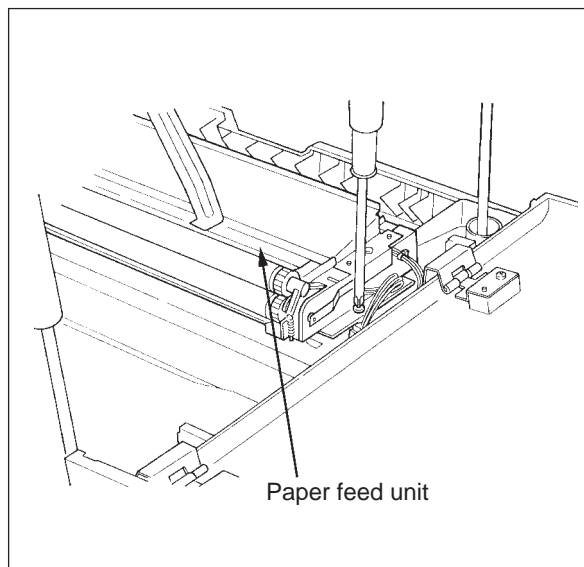


- (13) Removing two screws, take out the bracket and the gear can be replaced.

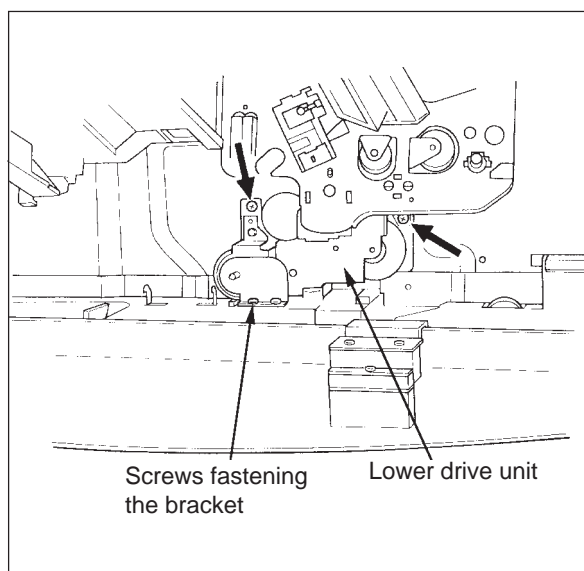


6.3.3 Lower drive unit

- (1) Remove the fuser unit.
- (2) Remove the transfer/separation charger.
- (3) Remove the transport guide.
- (4) Remove the connector cover of the feeder unit.
- (5) Remove the feeder unit (1 screw and connector).

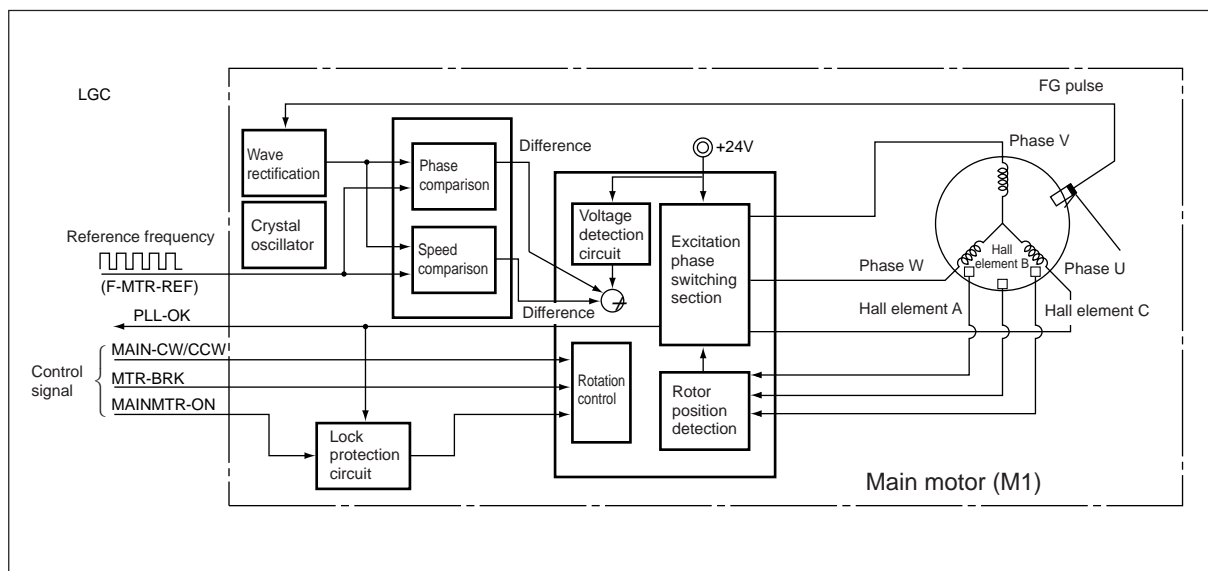


- (6) Remove the lower drive unit bracket (1 screw) and separate the drive unit from the bracket (2 screws).



6.4 Main Motor

6.4.1 Main motor drive



- (1) LGC outputs a control signal for main motor rotation. (MAIN-CW/CCW: Rotation direction, MAIN-MTR-ON: Motor rotation command)
- (2) The excitation phase switching section excites each phase of the main motor → main motor rotates.
- (3) Hall elements A-C detects rotation position of motor (rotor).
- (4) The excitation phase switching section switches the excitation of each phase.
(By repeating (2) through (4), the motor continues to turn.)
- (5) An FG pulse is generated by FG pattern attached to the main motor.
- (6) The FG pulse and the reference frequency are compared for their phase and speed, and their differences added to IC3.
- (7) Change the switch timing of the excitation phase switching section, according to the signal obtained at (6) above.
= Control so that the FG pulse and reference frequency are equal → main motor rotates at a fixed speed (lock-range condition).
- (8) As the main motor goes into the lock-range condition, the excitation phase switching section outputs a PLL-OK signal to LGC ("L" level).
- (9) When MTR-BRK from LGC goes to "L" level, the brake is applied to rotation of the main motor, and when the MAIN MTR-ON signal becomes "L" level, the main motor stops.

6.4.2 Control signal

(1) MAIN-CW/CCW (LGC → MTR: Input)

This is a signal to change the direction of rotation of the main motor. When the CW/CCW signal is at “L” level, the main motor rotates counterclockwise when viewed from the rear, and drives the developer, drum and heat roller in the designated direction.

(2) PLL-OK signal (MTR → LGC: Output)

When the FG pulse cycle difference against the reference frequency is within the range of +4.6% and –5.3%, it is defined as the lock range (normal state), and the signal becomes “L” and LED “ED1” comes ON.

(3) MTR-BRK signal (LGC → MTR: Input)

This is the signal to control the speed of the main motor. The brake is applied to the main motor when the signal becomes “L” level.

(4) MAINMTR-ON signal (LGC → MTR: Input)

This is a signal to turn ON/OFF the main motor. The main motor turns when this signal becomes “H” level.

(5) MOT-FG signal

This signal generates FG signals while the motor is rotating.

Signal level of motor circuit.

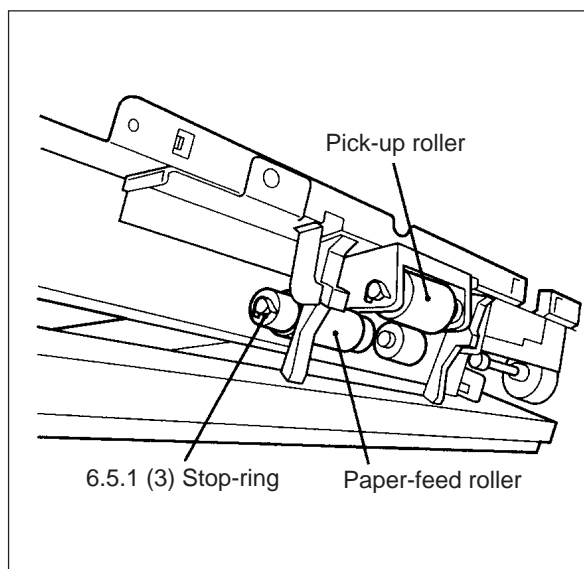
Signal name	“H” level	“L” level
MAIN-CW/CCW	CW direction	CCW direction
PLL-OK	Control deficiency	Normal
MOT-FG	Rotation pulse signal	
MTR-BRK	Brake OFF	Brake ON
MAINMTR-ON	Motor ON	Motor OFF

The signals are respectively the level on the input/output pins of IC1 and 3.

6.5 Bypass feed section (1560 only)

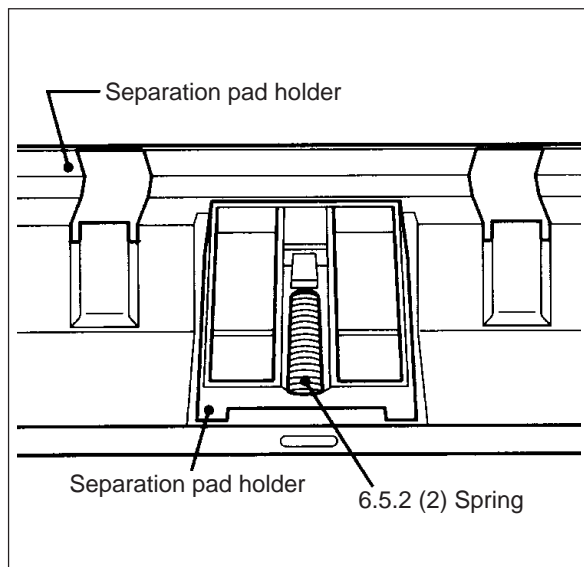
6.5.1 Bypass feed roller

- (1) Remove the main switch/door switch. (See item 2.4.2 [E-2])
- (2) Remove the feed roller stop-ring.
- (3) Take out the feed roller.



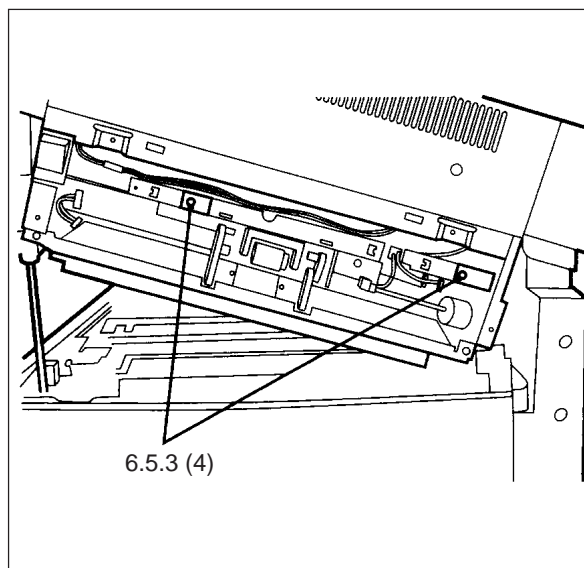
6.5.2 Removal of the separation pad

- (1) Remove the main switch/door switch (See item 2.4.2 [E-2]).
- (2) Take off the rear-side spring of the separation pad and remove the separation pad.



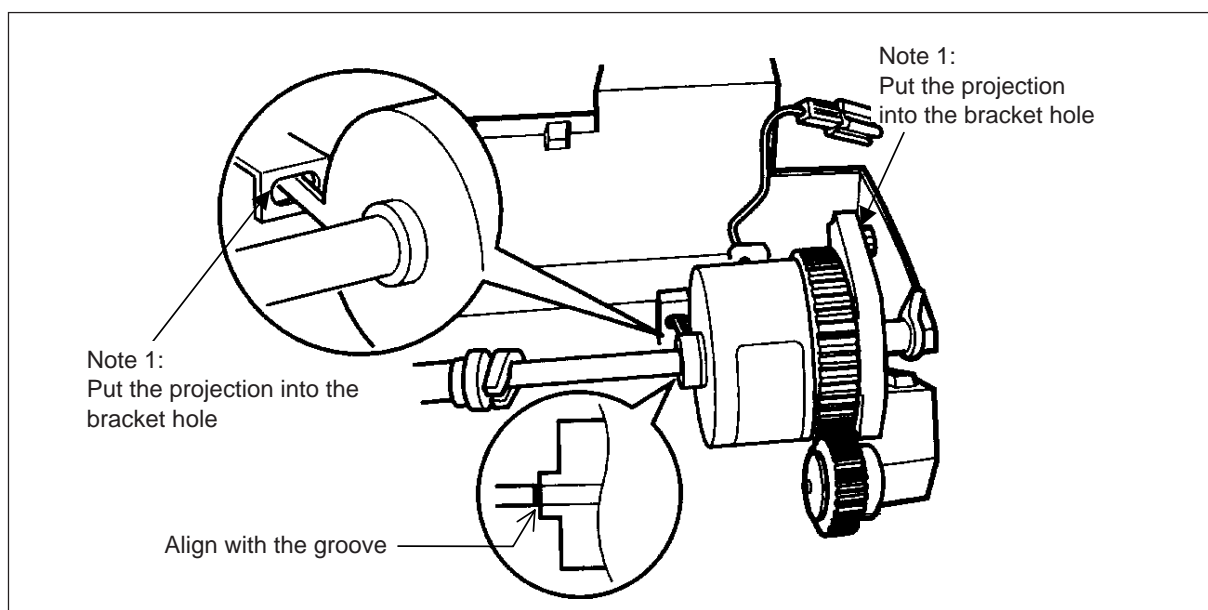
6.5.3 Removal of the clutch

- (1) Remove the main switch/door switch. (See item 2.4.2 [E-2])
- (2) Removal the clutch and the paper sensor.
- (3) Close the upper unit.
- (4) Remove 2 screws from the upper unit, slide the unit to the front and take it out in the direction of paper feeding.
- (5) Remove the hexagonal screw and the stop-ring of the clutch and take out the clutch.



<Notes>

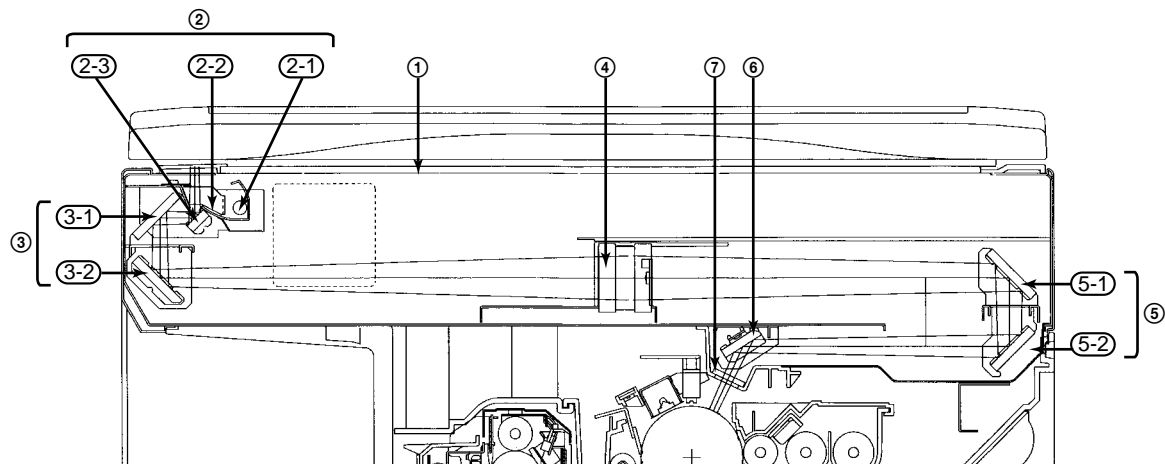
1. When installing the clutch, align the end face of the clutch to the shaft groove and align the hexagonal screw to the milling cutting surface. Insert the projection of the clutch and the gear arm in the hole of the bracket.
2. Confirm that there is no oil, etc. on the surface of the paper feed roller or the separation pad.
3. When reassembling the timing belt (removed when taking cut the pick-up roller) pass it through the upper side of the belt tensioner.
4. When installing the separation pad bracket to the copier, first free the paper stop lever by pushing down the pick-up roller downwards.



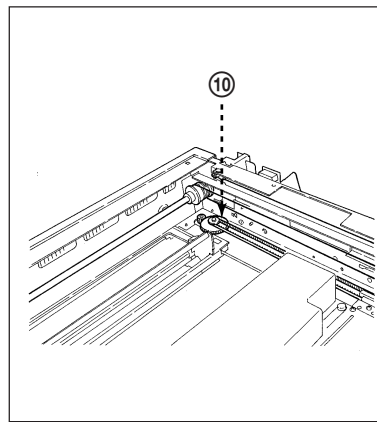
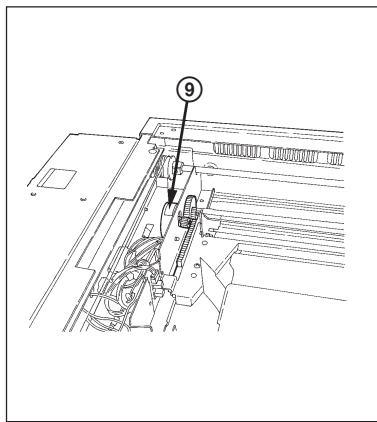
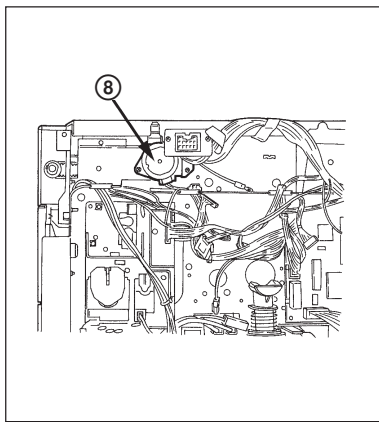
7. OPTICAL SYSTEM

7.1 Construction

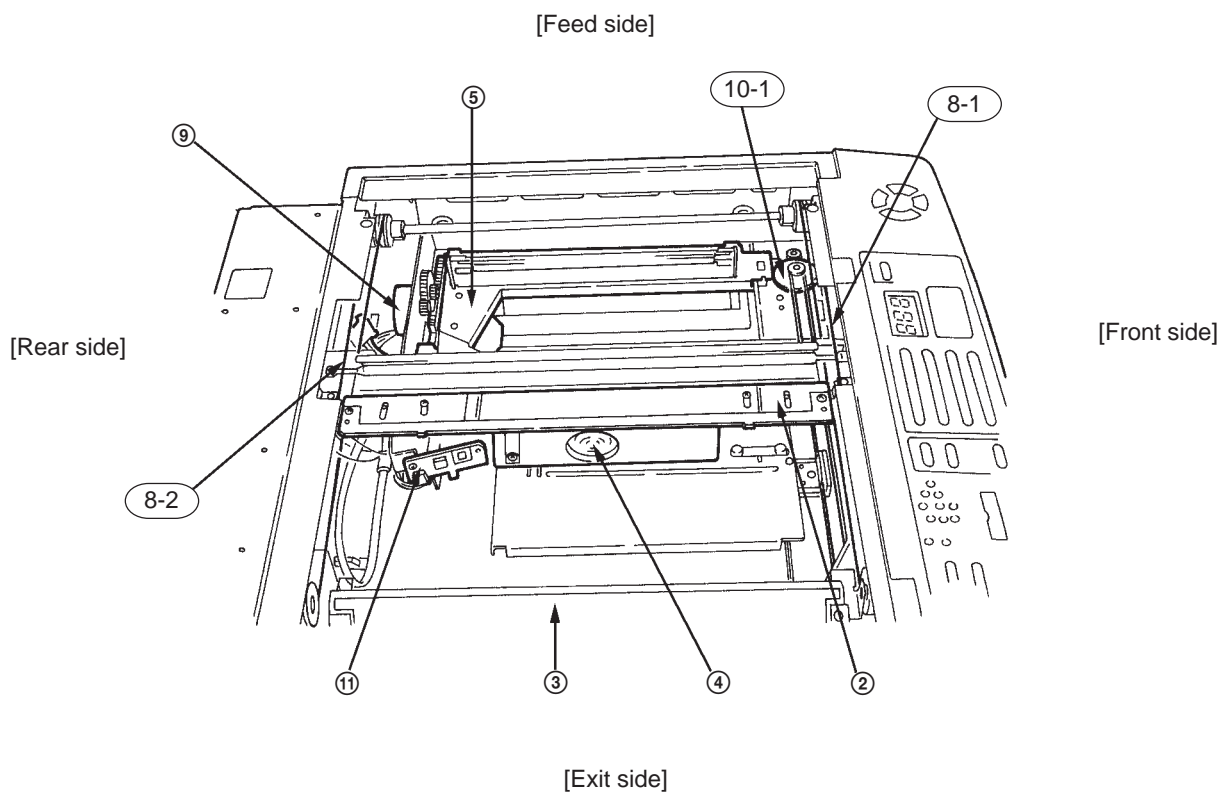
The optical system consists mainly of the original glass, carriage 1, carriage 2, lens unit, mirror unit and drive motors.



- ① Original glass
- ② Carriage 1 ——— (2-1) Exposure lamp, (2-2) Reflector, (2-3) Mirror 1
- ③ Carriage 2 ——— (3-1) Mirror 2, (3-2) Mirror 3
- ④ Lens unit
- ⑤ Mirror unit ——— (5-1) Mirror 4, (5-2) Mirror 5
- ⑥ Mirror 6
- ⑦ Slit glass



- ⑧ Scanning motor ——— ⑧-1, ⑧-2 Carriage drive wire
 ⑨ Mirror motor
 ⑩ Lens motor ——— ⑩-1 Lens drive belt (1 pc.)

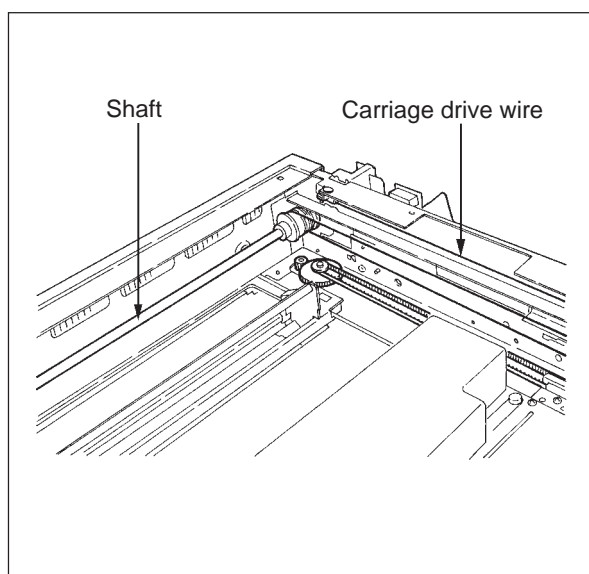
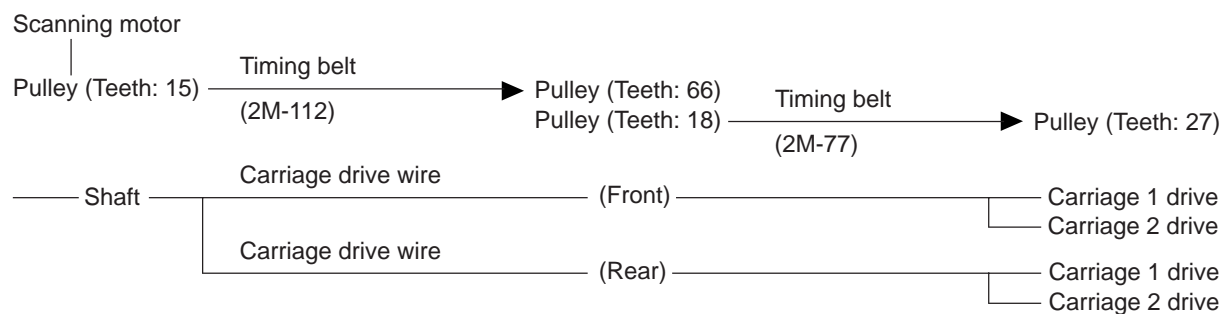


- ⑪ Auto exposure PC board

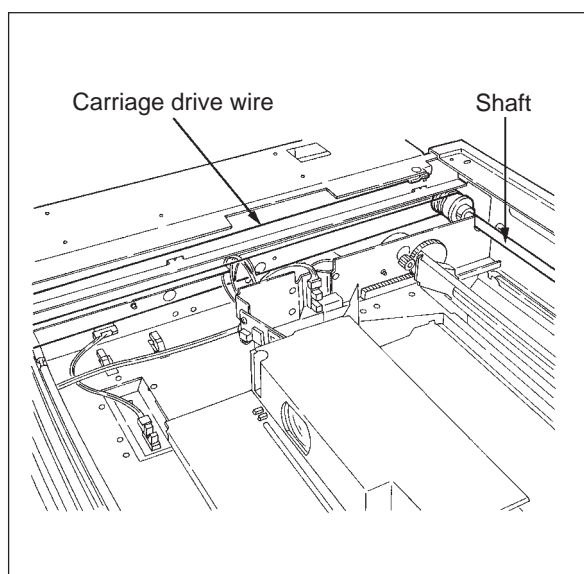
7.2 Explanation of Operation

7.2.1 Scanning motor

The rotation of the scanning motor (located on the rear) is transmitted to carriage 1 and 2.



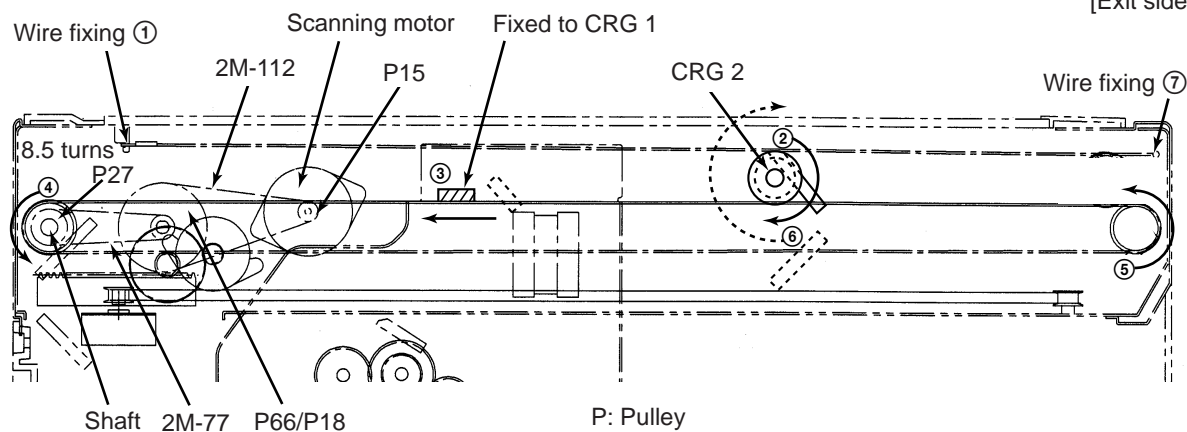
View as seen from the rear



View as seen from the front

[Feed side]

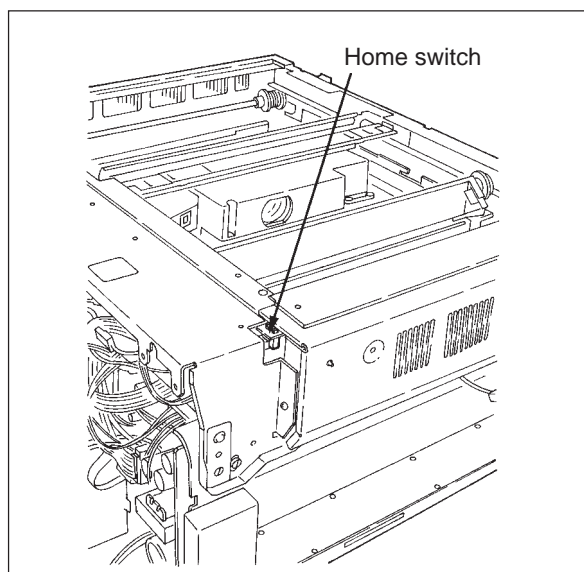
[Exit side]



View as seen from the rear

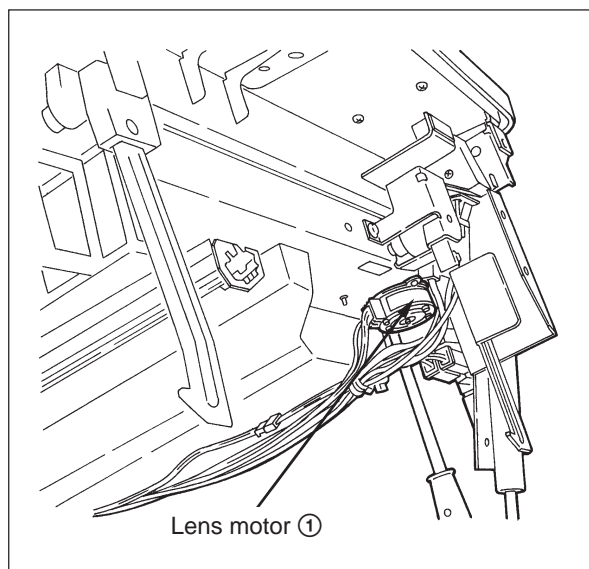
The scanning motor makes carriage 1 and 2 return to their home positions which are detected by carriage 1 passing the home switch.

When the PRINT key is pressed, the scanning motor causes carriage 1 and 2 to scan the original.

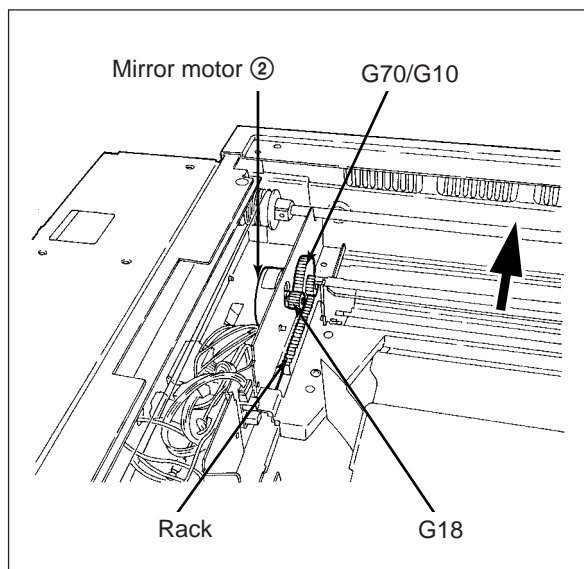


Rear side

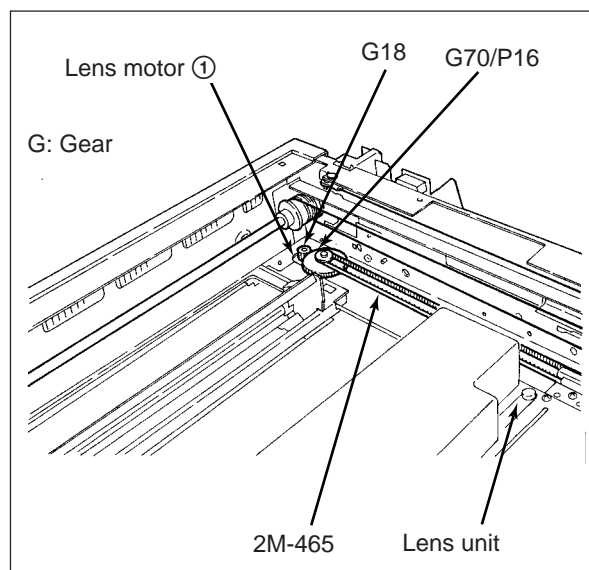
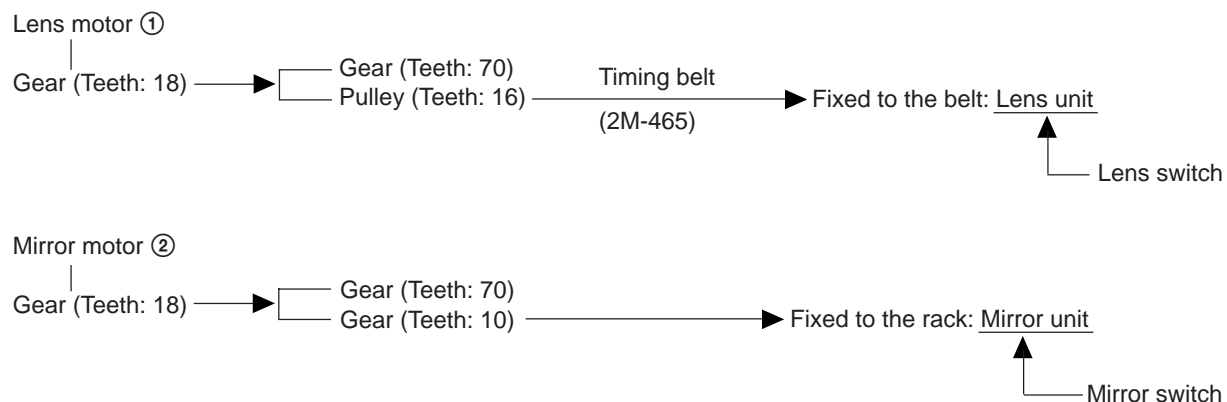
7.2.2 Mirror motor and lens motor



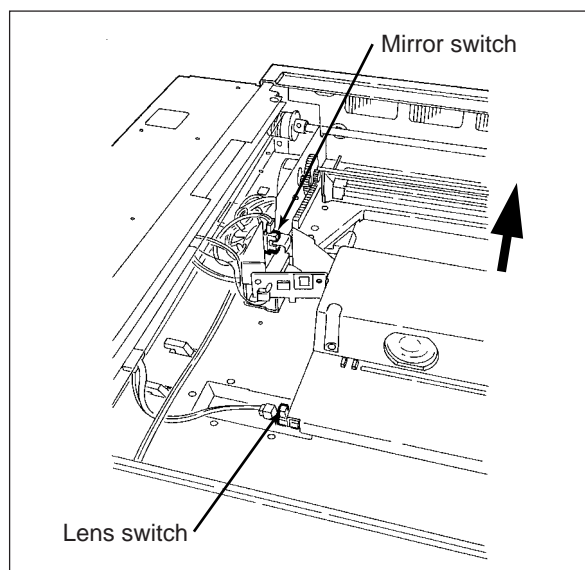
View with the process unit and the stay removed and the upper unit raised



View as seen from the front



View as seen from the rear



View as seen from the exit side

Immediately after the power on:

Both the lens unit and the mirror unit move from the position where the switches (lens switch and mirror switch) are turned on toward the feed side (arrow direction), respectively.

If the lens and mirror units were in the off position, they first move toward exit side, then after turning on the switch, move a specified amount toward the feed side, and stop at the actual-size (100%) position.

When a reproduction ratio is selected:

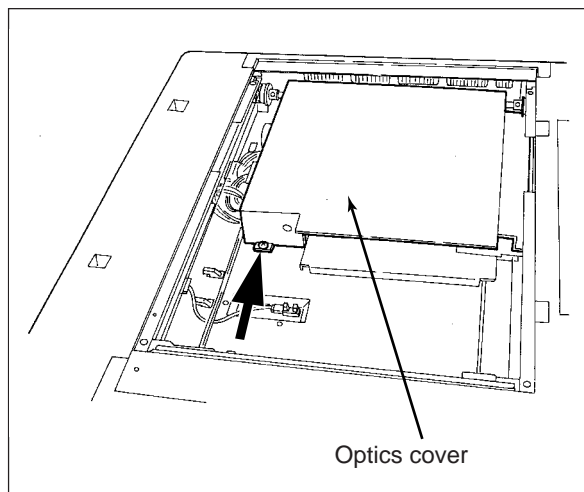
When a copy reproduction ratio is set, the lens unit and the mirror unit move to their respective positions for the specified reproduction ratio.

7.3 Disassembly and Replacement

At the time of disassembly or replacement, first remove the covers, process unit, original glass, etc., as required.

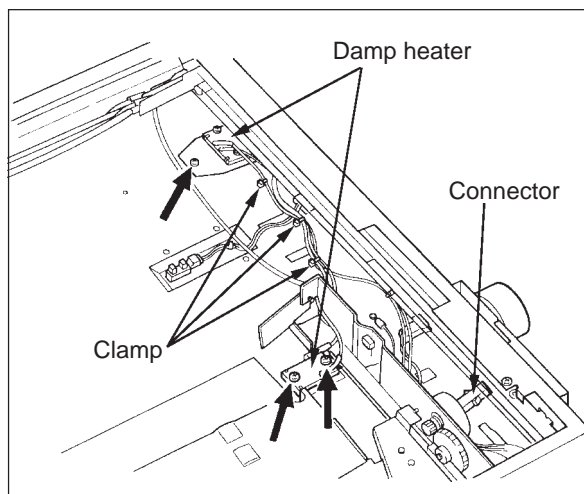
7.3.1 Auto exposure PC board and damp heater

- (1) Remove the original glass and move carriages 1 and 2 to the exit side.
- (2) Remove the optics cover (1 screw).



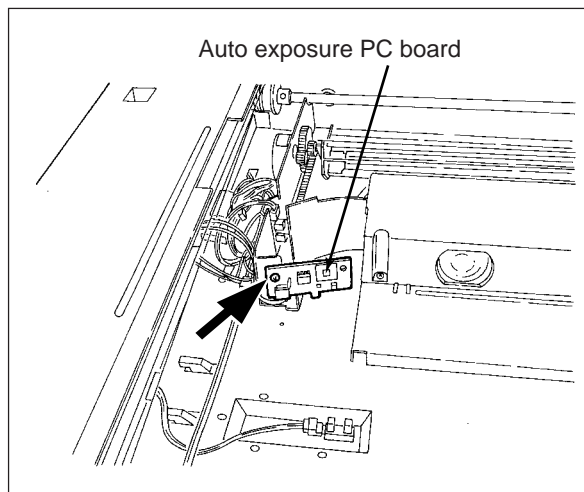
Damp heater: (Option)

- Remove three screws, three clamps and disconnect one connector.



Auto exposure PC board:

- Remove one screw, disconnect one connector and the PC board can be replaced.



7.3.2 Scanning motor (and timing belt)

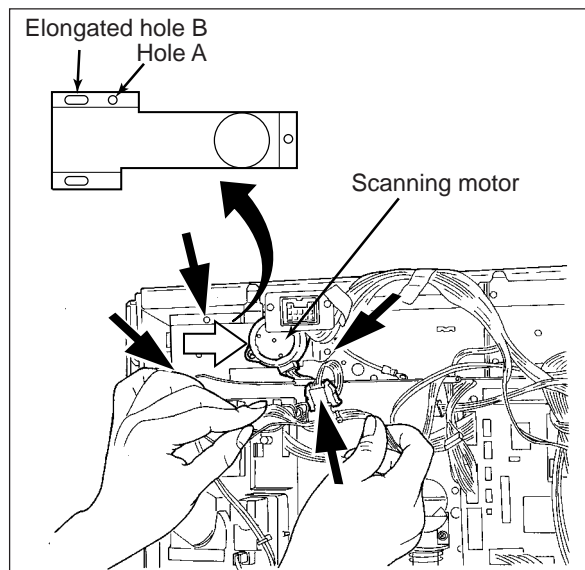
- (1) Remove the top cover.
- (2) Disconnect one connector.
- (3) After removing three screws, you can take out the whole unit. At this time, the timing belt (2M-77) is also removed.

Note: 1. When reassembling the parts, make sure that the timing belt is securely placed on the pulleys (P66/P18) and the shaft drive pulley (P22).

2. The scanning motor is screwed on in the position of the hole A at the time of shipping from the factory.

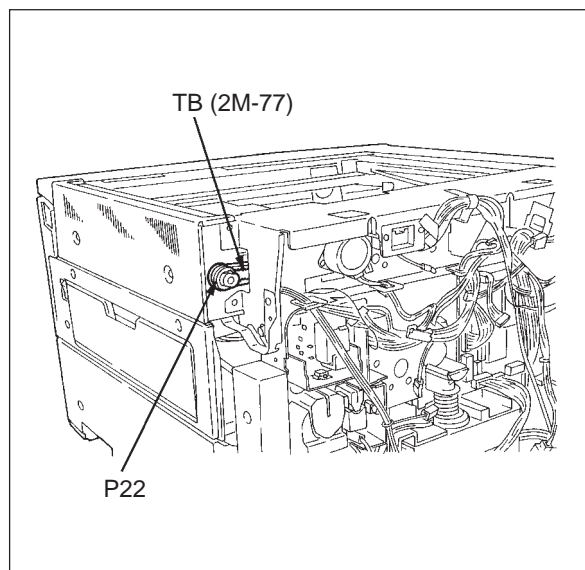
When the belt tension adjustment is necessary, reinstall the screw at the elongated hole B (not the hole A).

After having pushed the scanning motor in the direction of the arrow, install it.



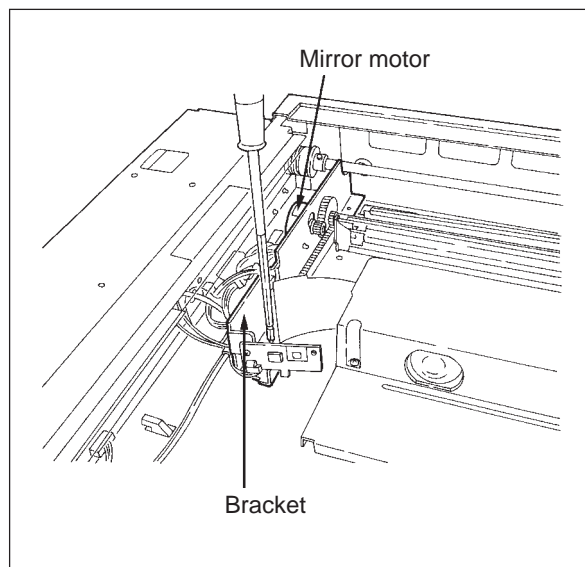
- (4) After taking out the unit, remove two screws and the motor is removed.

Note: When reassembling the parts, make sure that the timing belt is securely placed on the pulleys (P66/P18) and the shaft drive pulley (P22).



7.3.3 Mirror motor

- (1) Remove the original glass.
- (2) Remove the optics cover (1 screw).
- (3) After removing two screws, take out the bracket.
- (4) Remove two screws and disconnect one connector from the bracket and the mirror motor is removed.



7.3.4 Lens motor

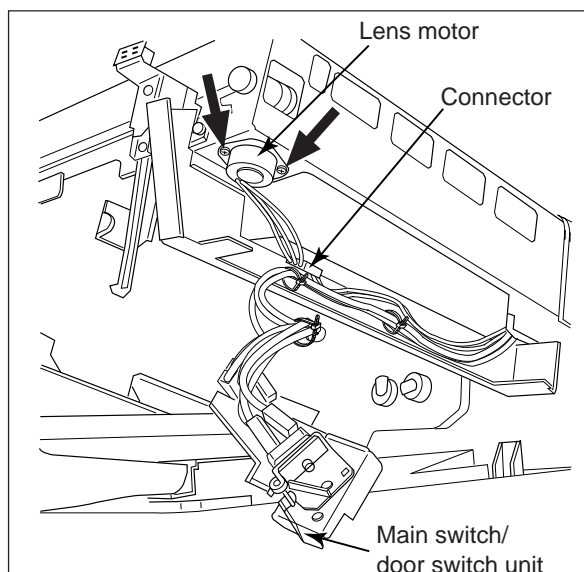
7.3.4.1 1550

- (1) Remove the main switch, door and switch unit (see item 2.4.2 [E-1]).
- (2) Remove the connector of the lens motor.
- (3) Remove the lens motor (2 screws).

Note: The shape of the mirror motor and the lens motor is same, but the output is different.

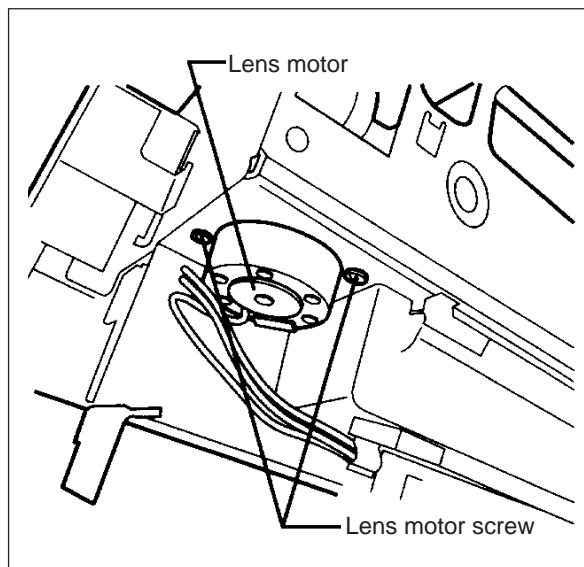
Mirror motor : silver maker name

Lens motor : red maker name



7.3.4.2 1560

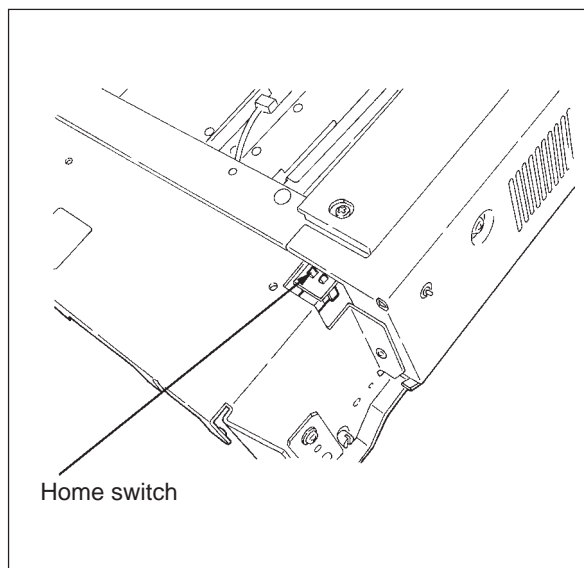
- (1) Remove the main switch/door switch. (See item 2.4.2 [E-2])
- (2) Remove the lens motor connector.
- (3) Remove the lens motor screw.



7.3.5 Home switch, mirror switch and lens switch

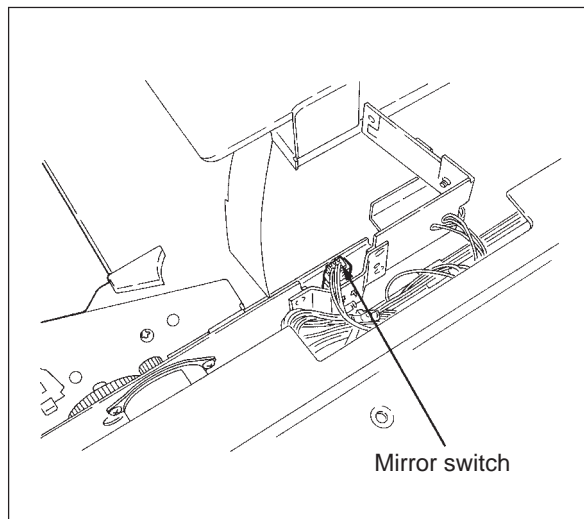
Home switch:

- (1) Remove the top cover.
- (2) Remove the switch by disengaging its claws.



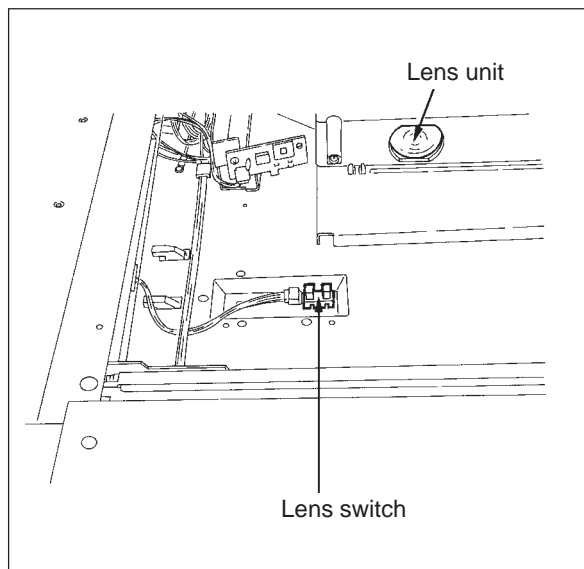
Mirror switch:

- (1) Remove the original glass.
- (2) Remove the optics cover (1 screw).
- (3) Move both carriages 1 and 2 to the exit side and the mirror unit to the feed side.
- (4) Remove the switch by disengaging its claws.



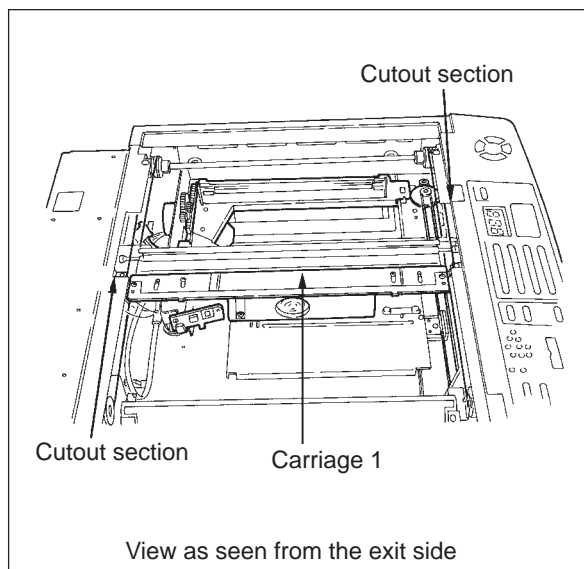
Lens switch:

- (1) Remove the original glass.
- (2) Move the lens unit to the feed side.
- (3) Raise the upper unit.
- (4) Remove the duct fan (1 screw).
- (5) Remove the switch by disengaging its claws.



7.3.6 Exposure lamp and thermofuse

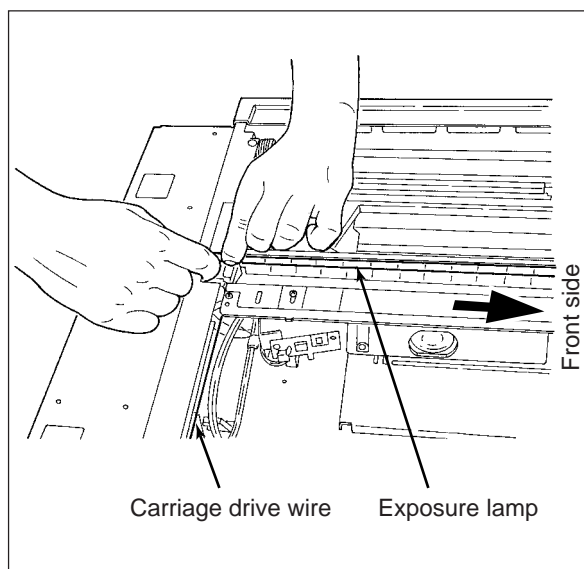
- (1) Remove the original glass.
- (2) Align carriage 1 with the cutout section of the frame.



Exposure lamp:

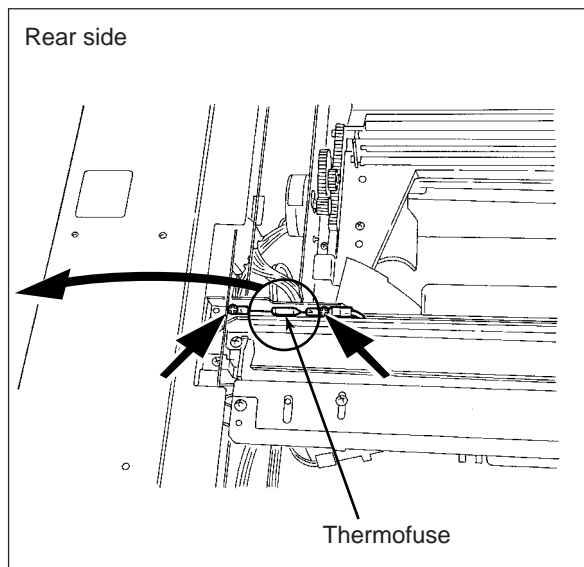
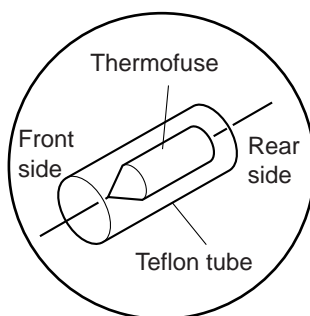
- (1) While pushing the lamp toward the front (➡), disengage it from the supply blade.

Notes: 1. During replacement, don't touch the lamp surface with a bare hand.
2. Be careful not to allow the lamp to get scratched by the wire.



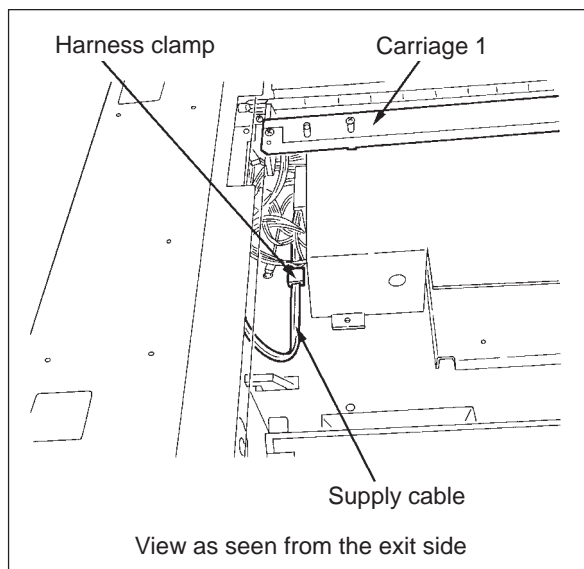
Thermofuse:

- (1) Remove two screws.

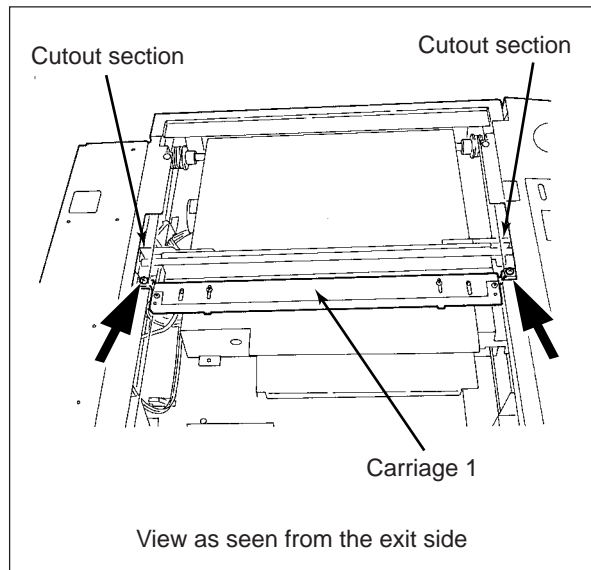


7.3.7 Carriage 1

- (1) Remove the supply cable's harness clamp and disconnect one connector.

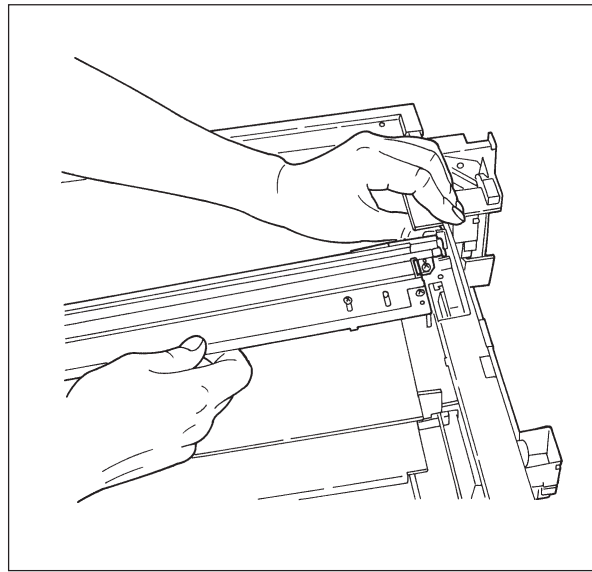


- (2) Move and align carriage 1 with the cutout section of the frame, then unhook the wire fixture (each screws for the front and rear).
- (3) Remove the power supply cable from the carriage 2's cable guide.



- (4) Slanting the whole carriage 1 unit, take it out upwards.

Note: Be careful not allow the unit to get hitched by the wire.

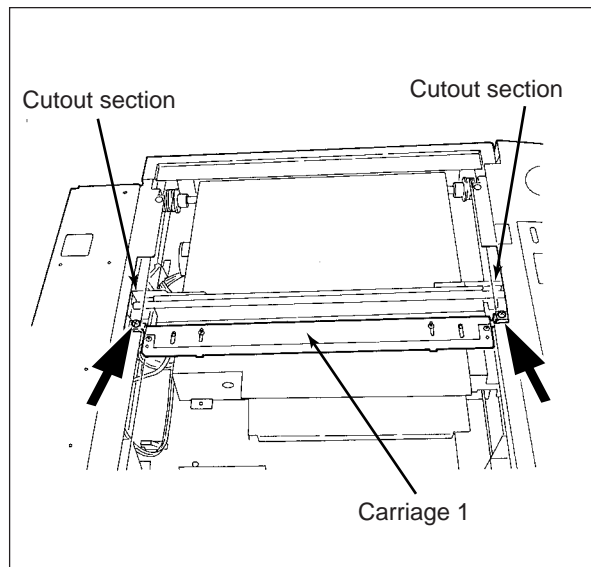


7.3.8 Carriage drive wire

The same procedure applies for removing the front and rear wires.

- (1) Remove the original glass, top cover, right-side cover (upper), left-side cover (upper), inner cover, and control panel.
- (2) Remove carriage 1 and the wire fixture (each screw for the front and rear).

Note: Be careful not to get hitched by the wire.

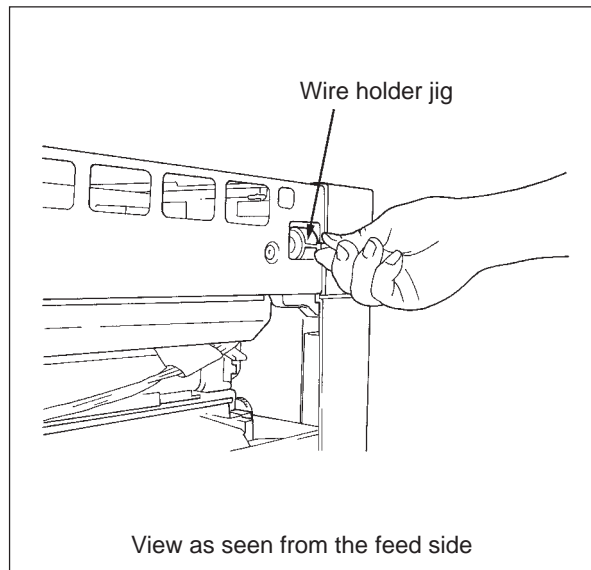


- (3) Using the wire holder jig, fasten the wire on the shaft, so that it does not loosen
..... at both front and rear.

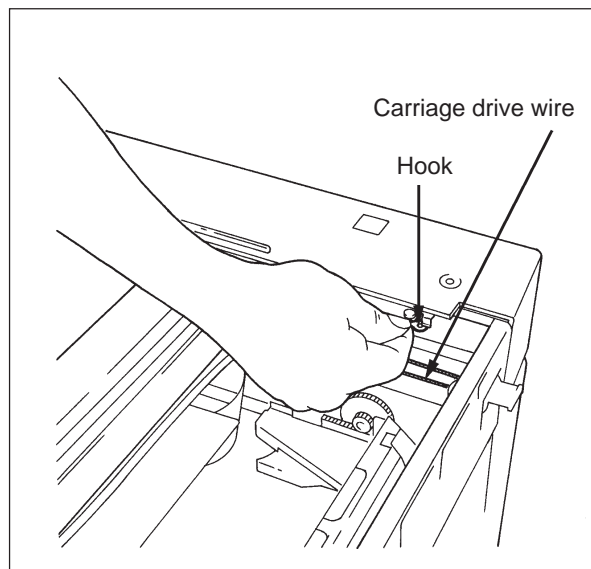
Note: The front side wire can be identified by its mark on the metal portion.

Front side wire : F

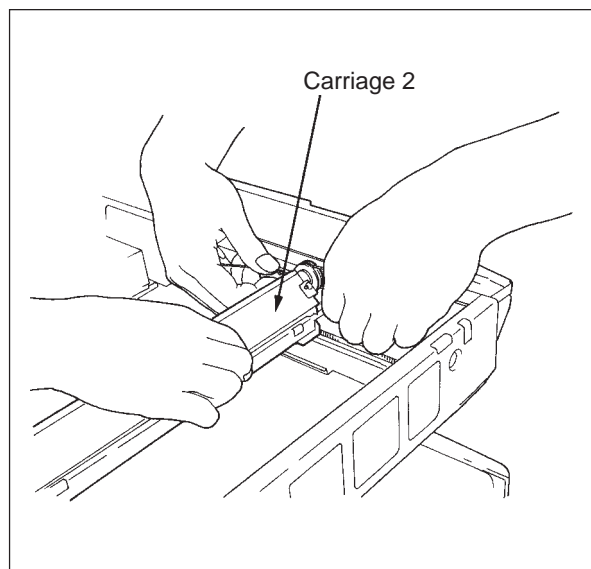
Rear side wire : R



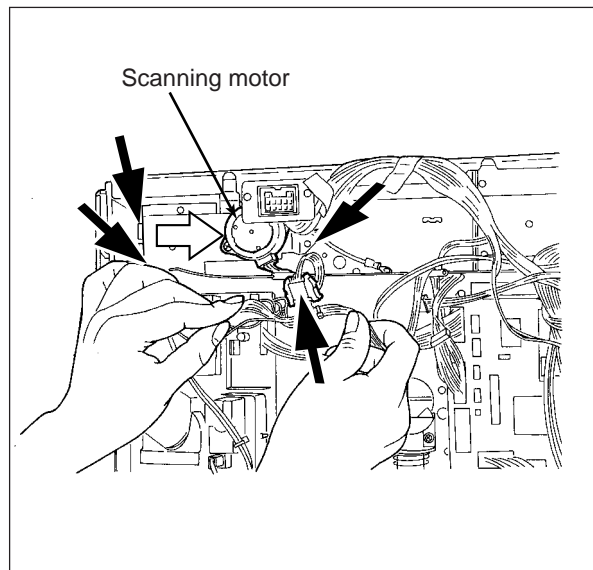
- (4) After having loosened the wire tension adjustment screw, disengage the hook on the feed side
..... for both front and rear.



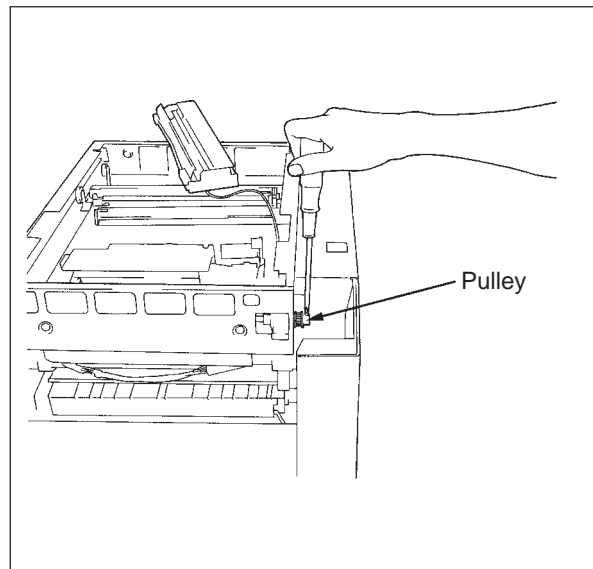
- (5) Remove carriage 2.



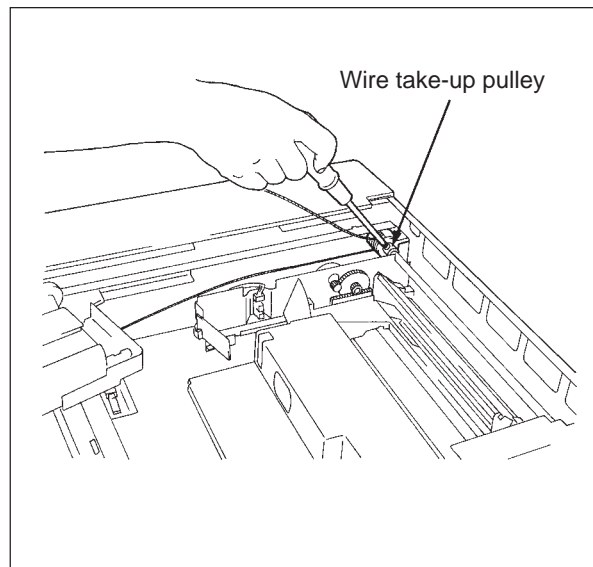
- (6) Remove the scanning motor (3 screws).



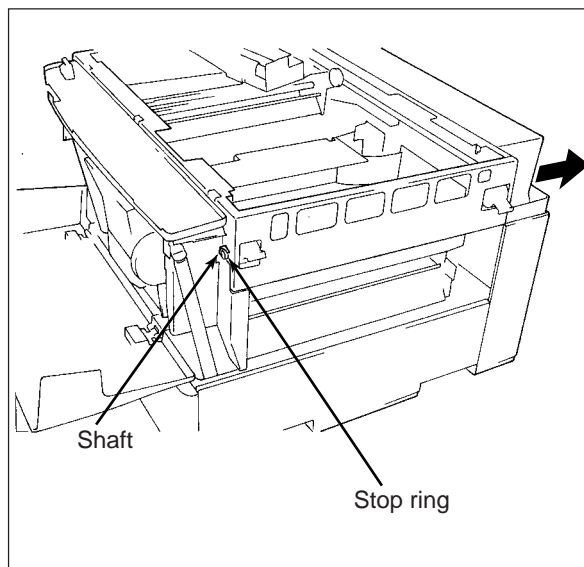
- (7) Remove the pulley on the rear side (1 screw).



- (8) Loosen the screw for the wire take-up pulley
located inside the frame
..... for both front and rear.

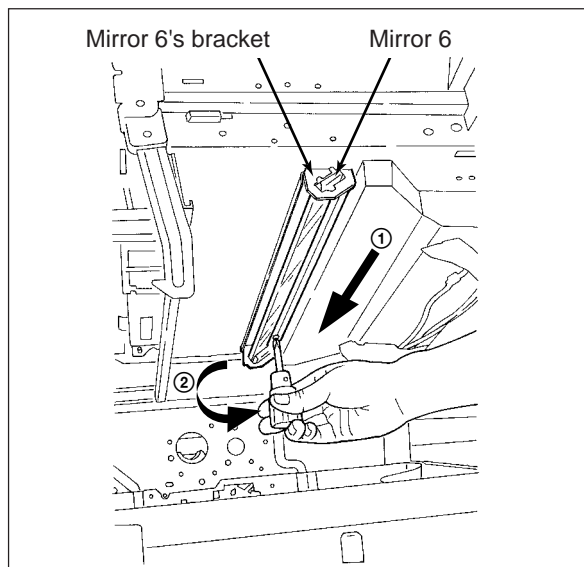


- (9) Remove the stop ring from the shaft (front).
- (10) Pull out the shaft from the rear.



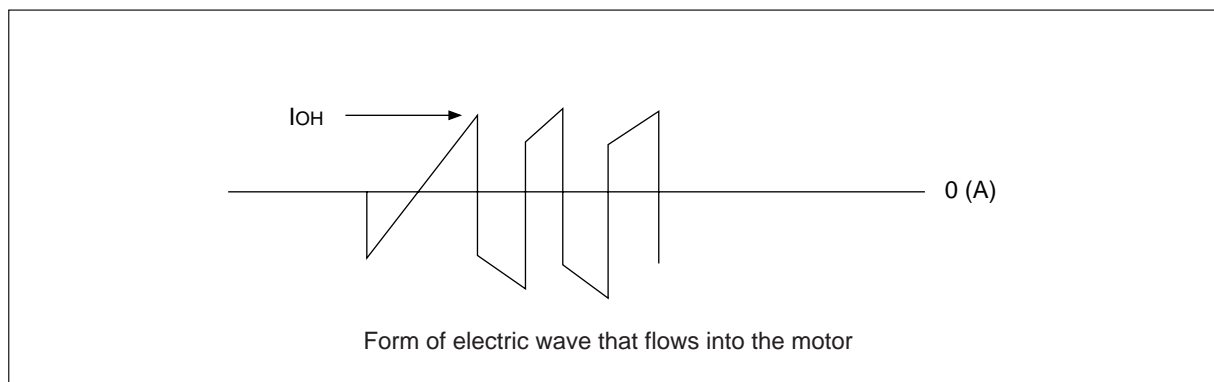
7.3.9 Mirror 6

- (1) Remove the process unit.
- (2) Remove the mirror 6's cover (1 screw).
- (3) Remove the mirror 6's bracket (1 screw).
- (4) Move the mirror 6's bracket in the directions of arrows ① and ② and take out the bracket.



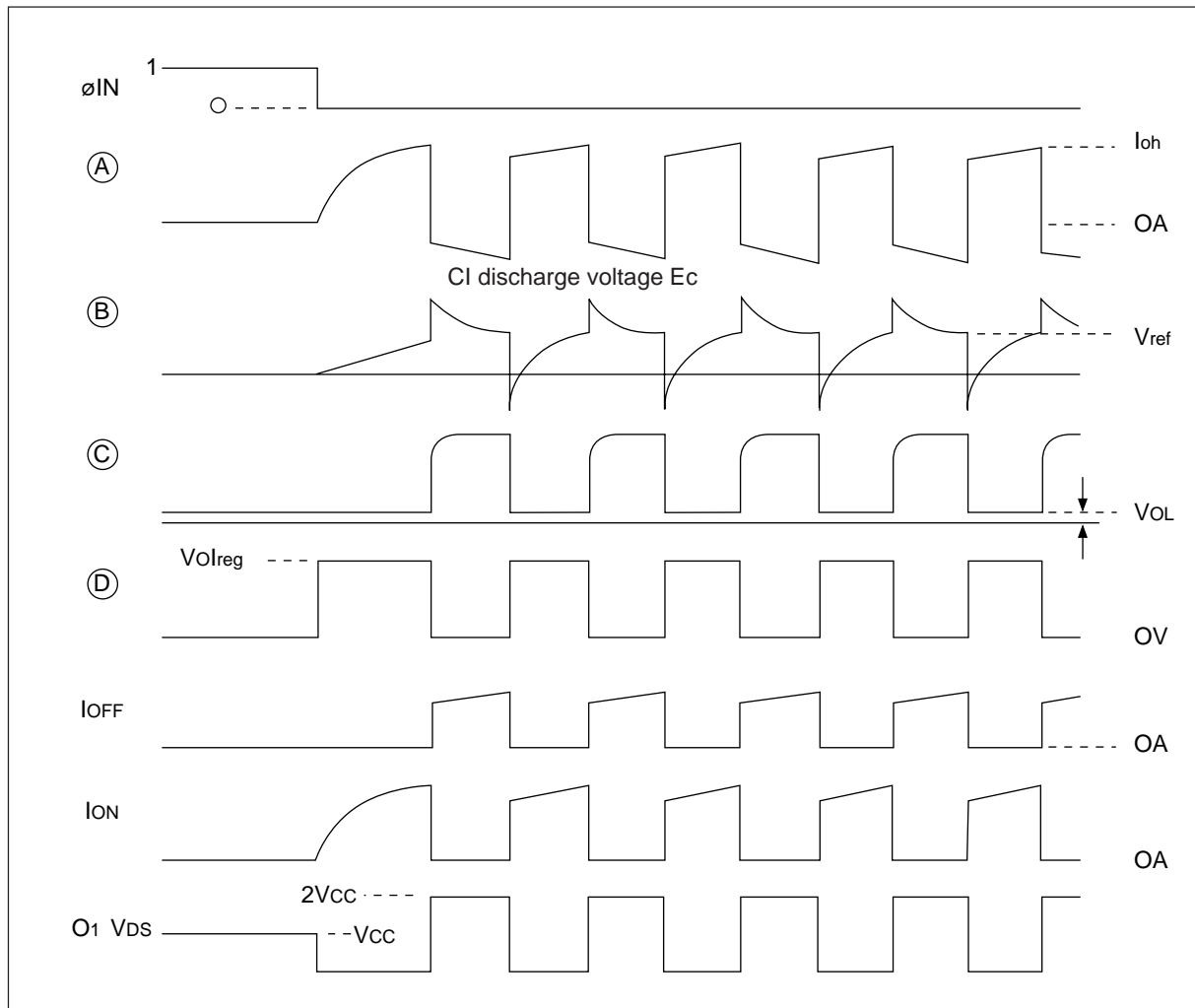
– Phase A excitation process –

- ① ϕA becomes “L” level ($\phi \bar{A}$ is “H” level).
- ② The reference voltage which is determined by a resistance type potential divider of R9, R10 and R11 is applied to reverse input ⑤ for comparator IC1 and non-reverse input ⑥ is “L”.
Therefore, IC1’s output ③ becomes “L” level.
- ③ Due to ① and ② above, ④ of IC2 becomes “L” level and F1 becomes ON (conductive state).
- ④ Electric current flows to coil A from the +24 V power supply and increases gradually.
- ⑤ The terminal voltage of the electric current detection resistance R1 increases, and as the ⑦ voltage gets higher than ⑤ voltage, ③ becomes “H” level and F1 becomes OFF.
- ⑥ As coils \bar{A} and A are bipolar wound, the energy accumulated in coil A is induced into coil \bar{A} and discharged using coil \bar{A} . In other words the electric current flows in the direction of DG → R9 → F2 diode → coil \bar{A} .
- ⑦ The voltage accumulated in capacitor C1 decreases, and when it gets lower than ⑤ voltage, ③ goes to “L” level and F1 comes ON again to increase the phase A winding electric current.
- ⑧ The above ON/OFF operation (constant current chopping) of the electric current for the motor is repeated (refer to the diagram below).

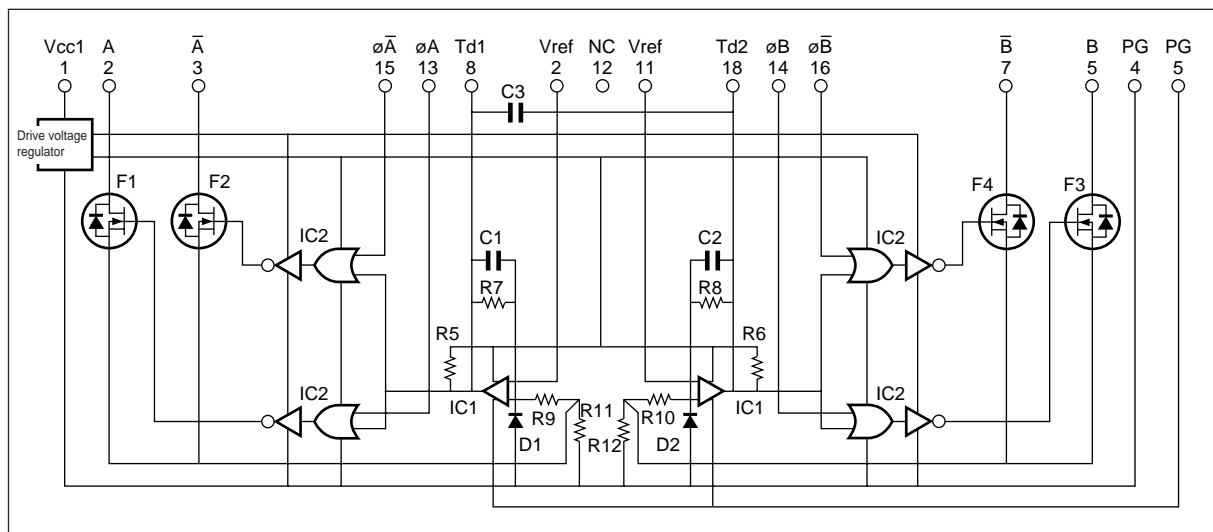


When exciting phase \bar{A} , phase $\phi \bar{A}$ becomes “L” level, while F2 becomes ON, and a similar operation is conducted.

Shown below is the waveform timing chart of each section:

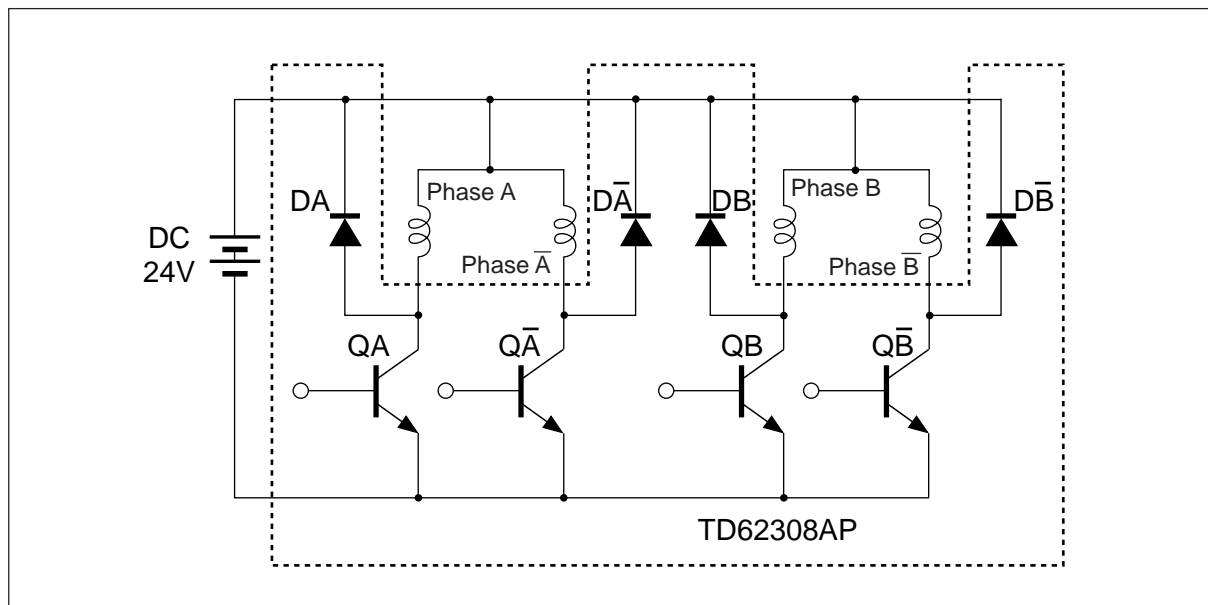


Equivalent circuit of STK6712B



7.4.2 Pulse motor drive circuit (constant voltage type) (M3, M4)

- { Lens motor (M3) (LMS-MTR) ~Driven by IC5 (Logic PC board: TD62308F)
- { Mirror motor (M4) (MRR-MTR) ~Driven by IC4 (Logic PC board: TD62308F)



The diagram on the right shows signals impressed to QA, QB, \overline{QA} , and \overline{QB} bases in two-phase excitation.

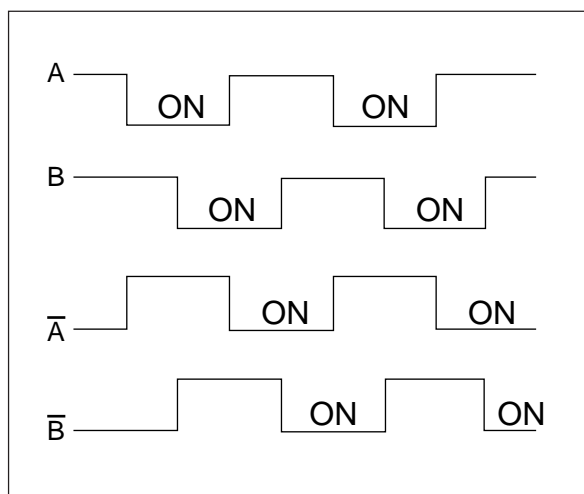
The ON/OFF combination of the transistor is switched.



The combination of phases to which the current flows is switched.



Motor rotates



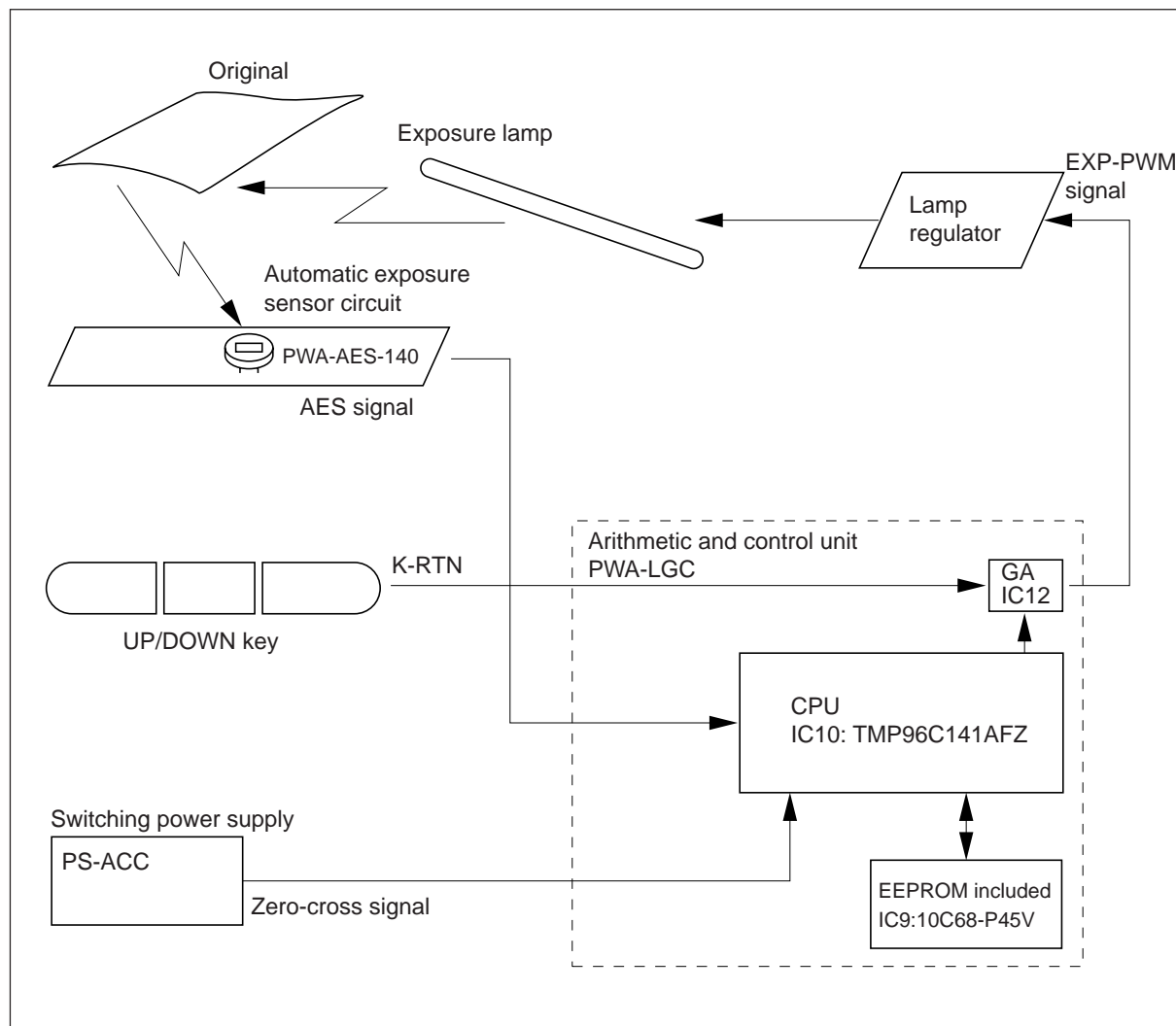
7.5 Exposure Control Circuit

(1) Brief description

The exposure control circuit is composed of the following four blocks.

- | | |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| ① Lamp regulator | Impresses a voltage corresponding to the duty ratio of the EXP-PWM signal upon the exposure lamp. |
| ② Automatic exposure sensor circuit | Generates an AES signal indicating the density of the original by sensing the light reflected by the surface of the document. |
| ③ Arithmetic and control unit | Determines the lamp voltage by computation on the basis of AES and K-RTN signals, etc., and outputs the EXP-PWM signal to the lamp regulator. |

***Note:** The ON/OFF state of the exposure lamp is controlled by a special signal (EXPON), which is different from the EXP-PWM signal.

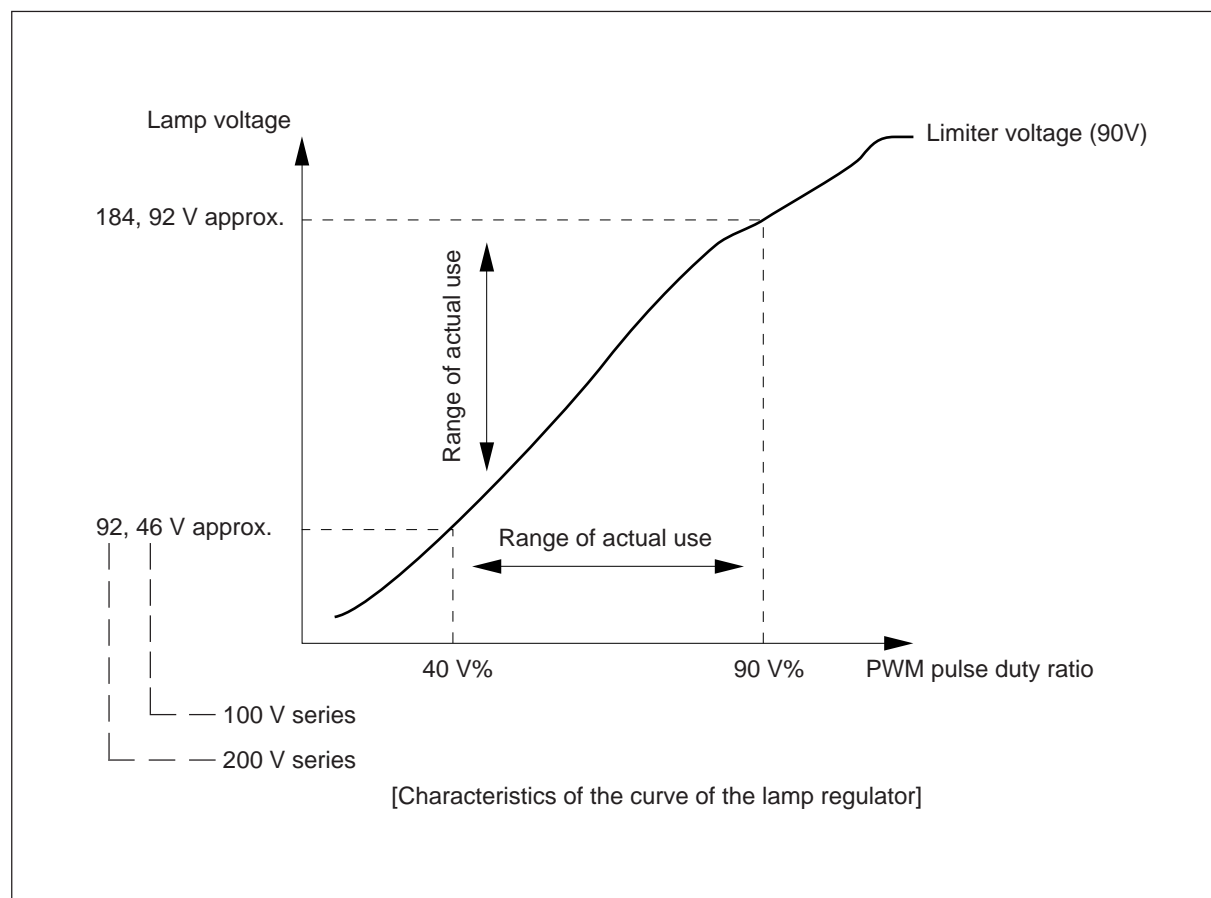


The exposure control circuit has the following two functions:

- Ⓐ Manual exposure mode Impresses a constant lamp voltage corresponding to the setting by the UP/DOWN keys on the exposure lamp.
- Ⓑ Automatic exposure mode The quantity of light reflected by the surface of the original, which varies according to its lightness and darkness, is detected by the automatic exposure sensor circuit, and the voltage impressed on the exposure lamp is varied accordingly; a high lamp voltage being impressed when the original is dark and a low lamp voltage when it is light.

(2) Function of lamp regulator

A typical characteristic curve is shown below. By means of a phase-angle control system, it is controlled so that a lamp voltage corresponding to EXP-PWM pulse duty ratio input is generated even when some fluctuation occurs in the AC input voltage.



(3) Automatic exposure sensor circuit (PWA-F-AES-140)

Through the action of IC1, the incidence of light upon photocell PD1 generates an AES signal on J3-6.

Dim reflected light→ Small AES output

Intense reflected light→ Large AES output

(4) Arithmetic and control unit

The arithmetic and control unit is composed of the following two blocks.

- ① EEPROM built-in SRAM Consists of IC9 (STK10C68), which stores exposure adjustment data to ensure that optimal exposure is performed for each reproduction ratio and for automatic exposure.
(NV-RAM)
- ② CPU (IC10) Incorporates software which computes the voltage to be impressed on the lamp in accordance with such copying modes as photographic magnification, automatic exposure, and manual exposure, as well as adjustment data inside the SRAM.

7.6 Lamp Regulator Circuit

The lamp regulator performs control to maintain the amount of light of the exposure lamp at a constant value by monitoring the AC input voltage.

(Method)

- Detects the AC input voltage.

↓

- Changes the input voltage to a DC voltage approximate to its effective value by means of the waveform shaping circuit.

↓

- This DC voltage is compared with the reference voltage made by shaping the pulse signal and is amplified.

↓

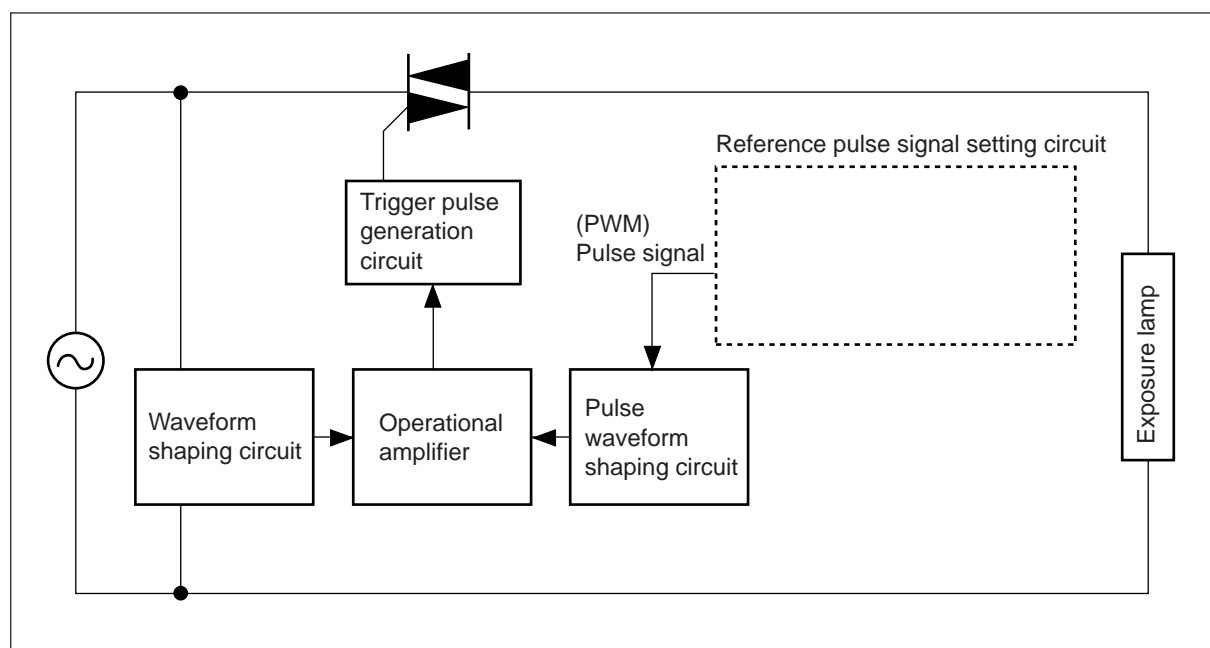
- Based on the reference voltage and the input voltage, the trigger pulse generation circuit generates trigger pulses in synchronism with the frequency of the power supply.

↓

- Controls the conduction angle of the triac.

||

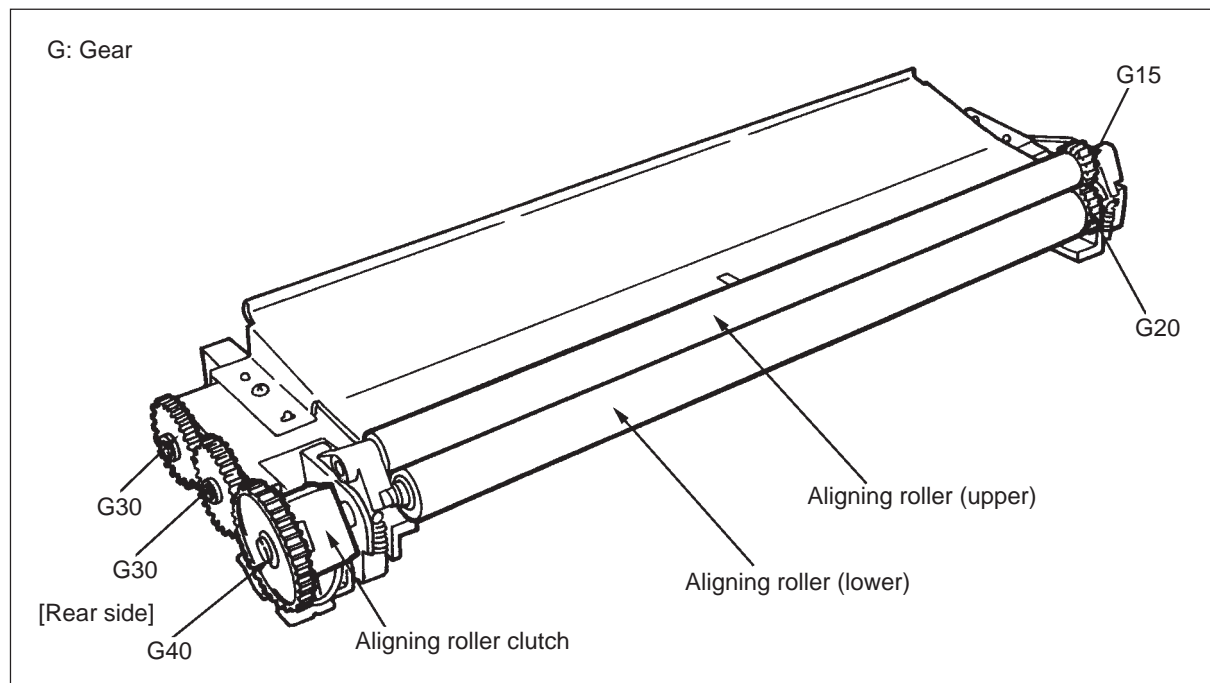
The voltage applied across the lamp is kept consistent.



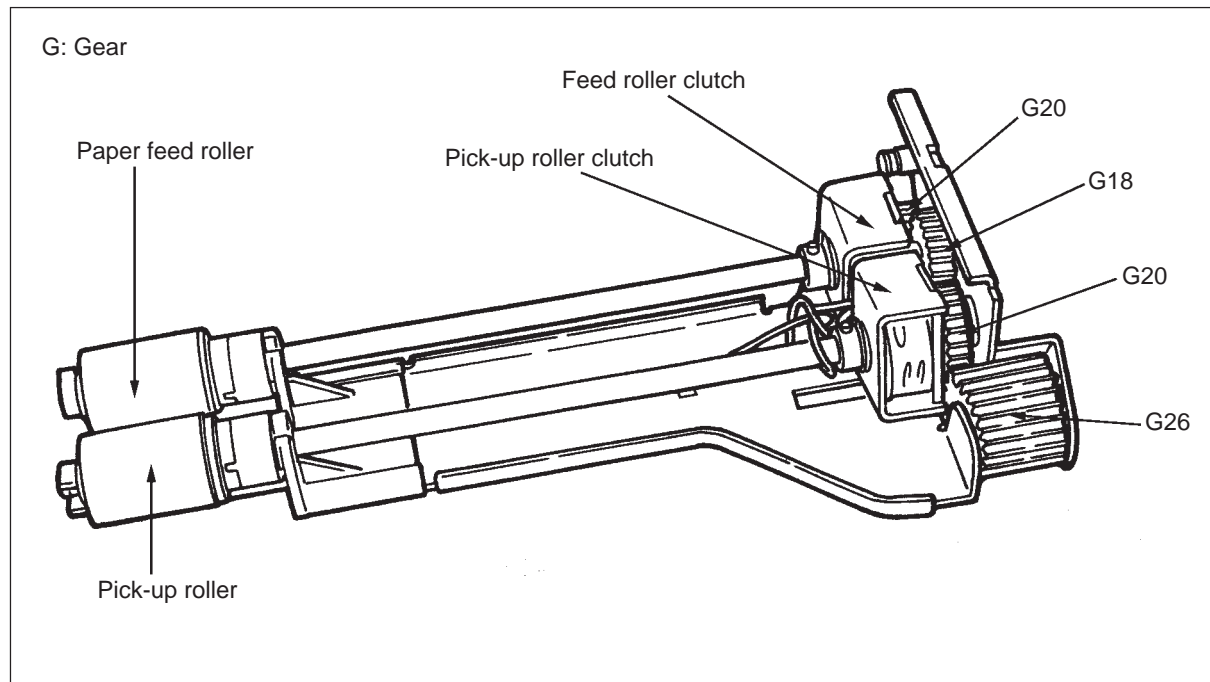
8. FEEDER UNIT

8.1 Construction

The paper feeder unit consists of upper and lower paper feeder units.



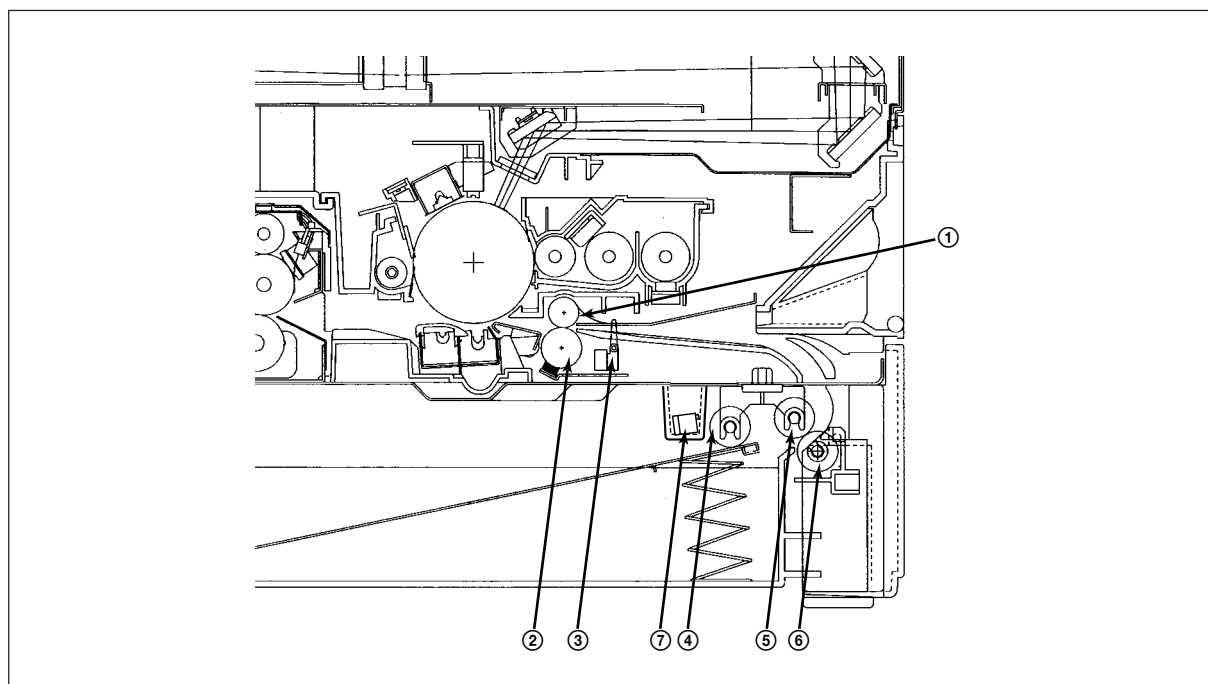
Upper paper feeder unit



Lower paper feeder unit turned upside down

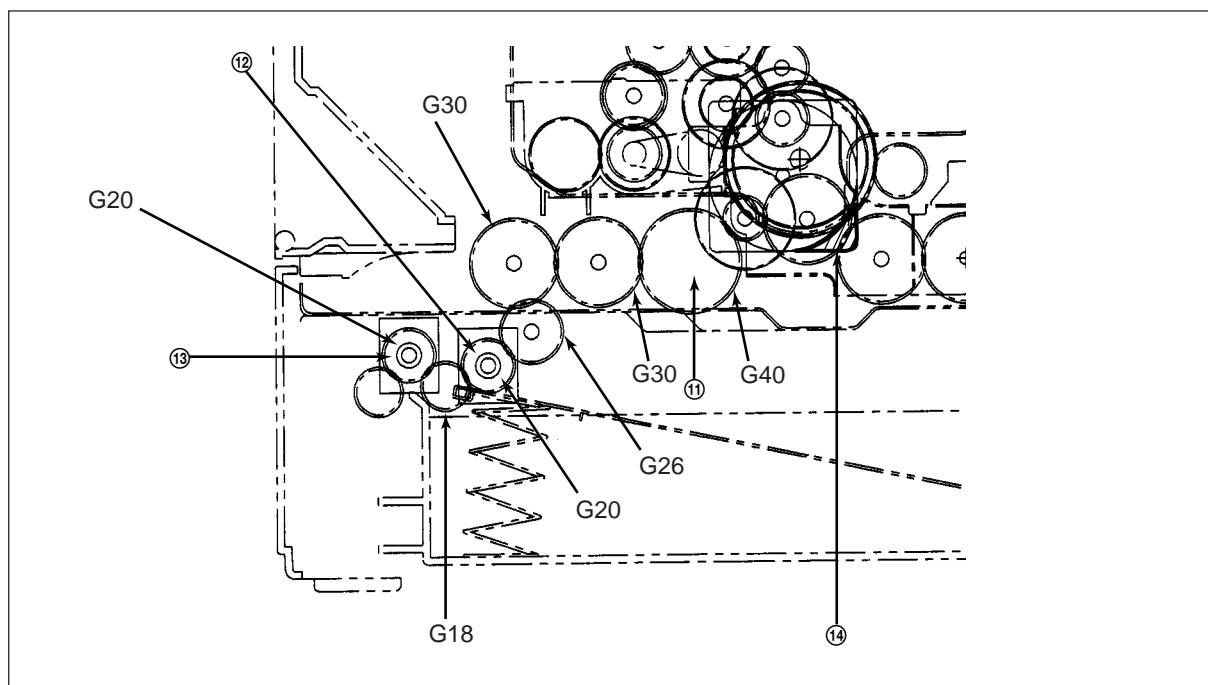
8.2 Explanation of Operation

8.2.1 Paper feeding operation



View as seen from the front

- | | | |
|---------------------------|---------------------------|---------------------|
| ① Aligning roller (upper) | ② Aligning roller (lower) | ③ Aligning switch |
| ④ Pick-up roller | ⑤ Paper feed roller | ⑥ Separation roller |
| ⑦ Paper empty switch | | |



View as seen from the rear

- | | |
|--------------------------|-------------------------|
| ⑪ Aligning roller clutch | ⑫ Pick-up roller clutch |
| ⑬ Feed roller clutch | ⑭ Main motor |

(A) Manual feeding operation

- Paper manually inserted pushes the aligning switch ③.
- When the PRINT key is pressed, the main motor starts rotating and the aligning roller clutch ⑪ is energized, causing the paper to be sent to the transfer process.

(B) Cassette feeding operation

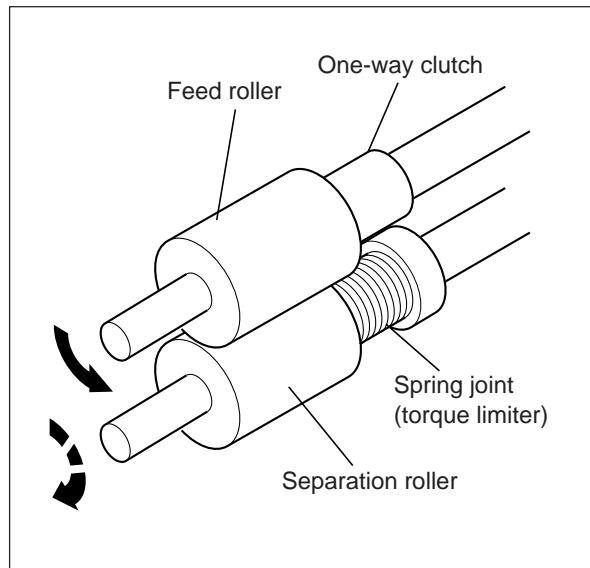
- Electromagnetic clutches (feed roller clutch and pick-up roller clutch) are energized to rotate the pick-up roller ④ and feed roller ⑤, starting paper feeding.
- Electromagnetic clutch ⑫ for the pick-up roller is de-energized, with the paper left pushing the aligning switch ③.
- The paper is aligned by the aligning rollers ① and ②, the electromagnetic clutch ⑬ for the feed roller is de-energized, the aligning roller clutch ⑪ comes ON, then the paper is sent to the transfer process.

8.2.2 Paper separation operation

Since no paper separation claws are used in the cassette, a paper separation roller is installed inside the machine. The separation roller section consists of a paper feed roller, one-way clutch, separation roller spring joint, etc., as shown.

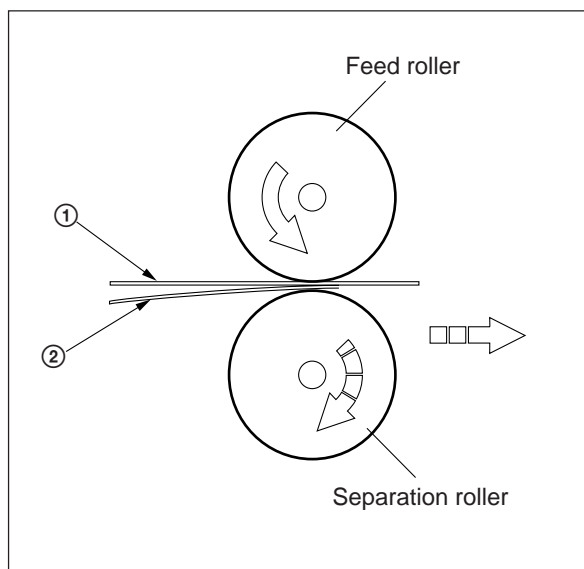
The feed roller is equipped with a weight and rotates in the direction of the arrow (↺) at the same timing with the pick-up roller.

The separation roller shaft, equipped with a torque limiter based on a spring joint, is designed to rotate in the direction of the arrow (↻) and transmits its rotation to the separation roller through the spring joint.



For example, when only one sheet of paper ① is sent to the separation area, since the feed roller's transporting force is stronger, the separation roller is forced to rotate in the direction of the arrow (↺), causing the sheet to be sent toward the aligning roller.

If, as shown, two sheets are fed at the same time, since the friction between the sheets is smaller, the lower sheet is stopped being fed any further while the upper sheet is forced to be transported by the feed roller in the direction of the arrow (⇒).

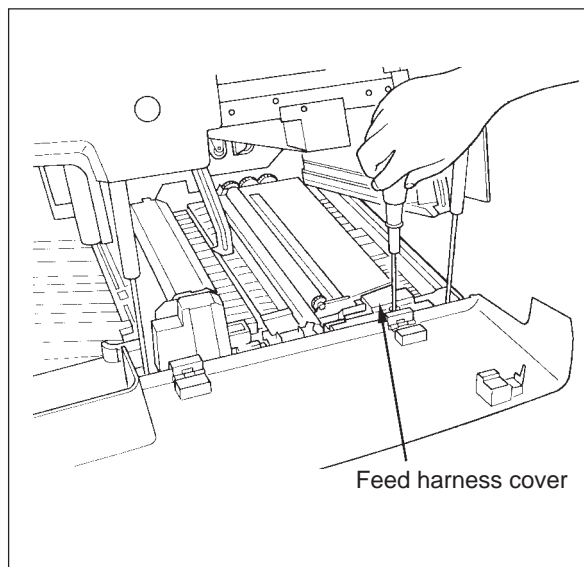


8.3 Disassembly and Replacement

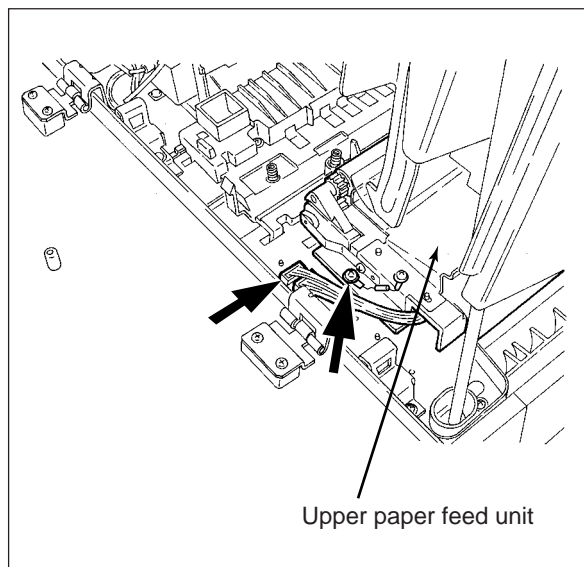
Depending upon the locations of the parts to be disassembled or replaced, covers should be removed or the upper unit should be opened as required.

8.3.1. Upper paper feed unit

- (1) Remove the transfer/separation charger unit.
- (2) Remove the feed harness cover (1 screw).

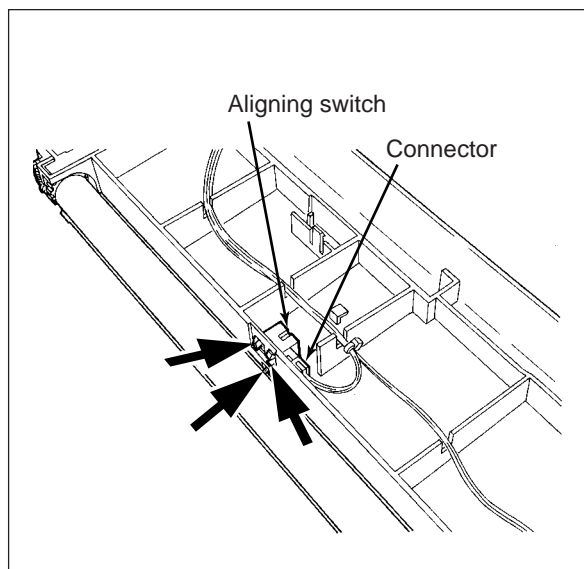


- (3) After removing one screw and disconnecting one connector, pull the unit out to the front and lift it out.



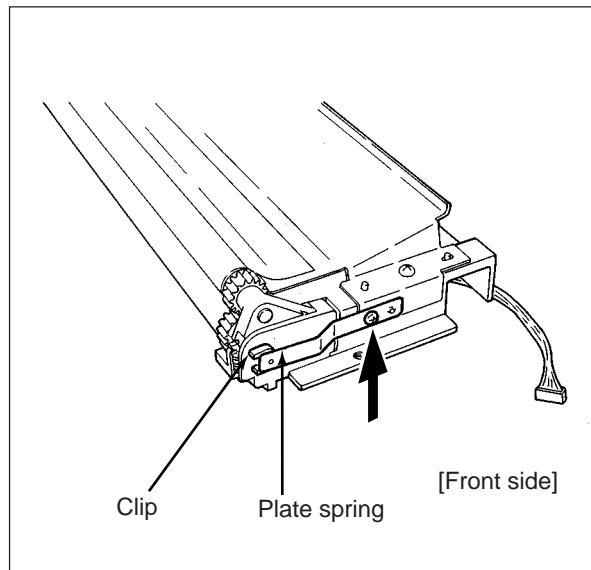
Aligning switch:

- (1) Place the upper paper feed unit upside down.
- (2) Remove the paper dust brush.
- (3) Disengage three claws and disconnect one connector.

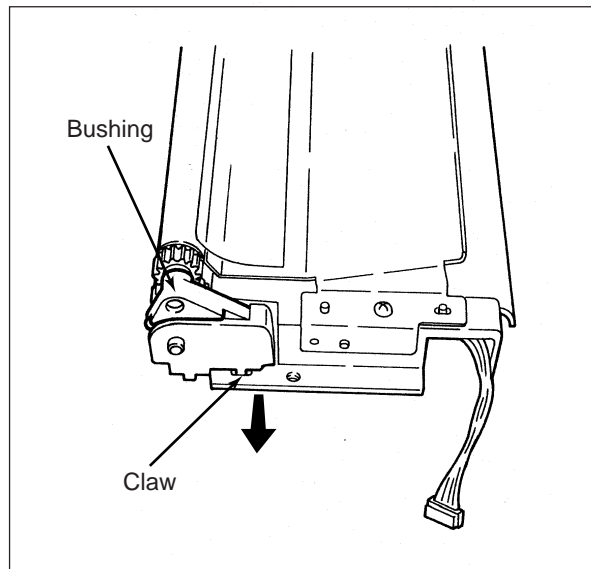


Clutch and aligning rollers (upper/lower):

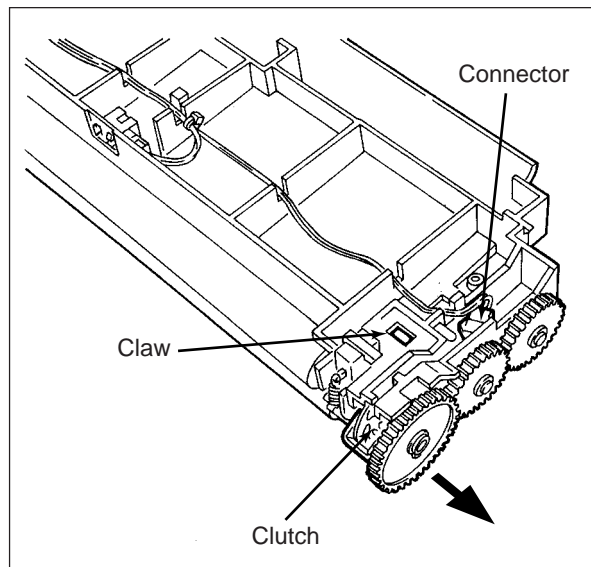
- (1) Remove the plate spring (1 screw).
- (2) Snap off the clip.



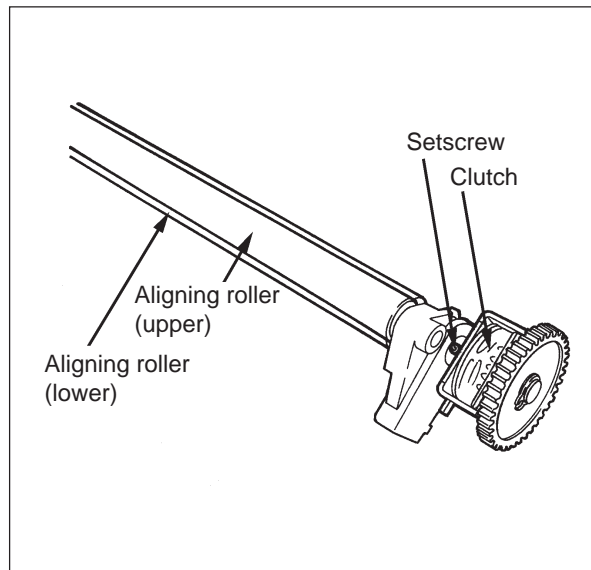
- (3) While pushing down the claw, pull out the bushing toward the front.



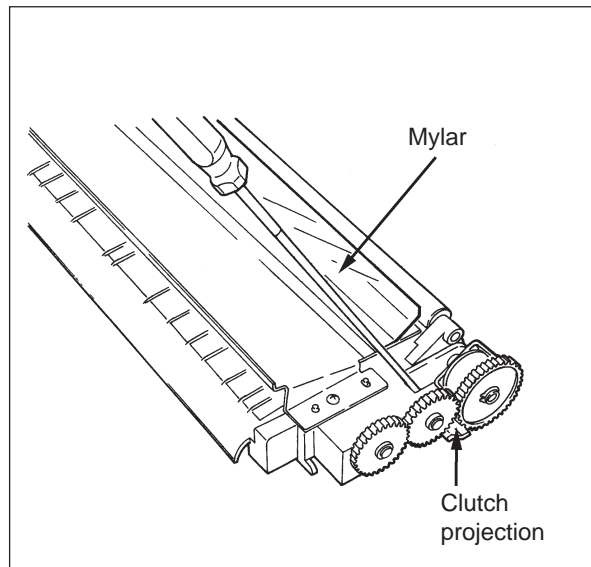
- (4) Disconnect one connector.
- (5) While pushing down the rear claw, pull out the bushing toward the rear.



- (6) Removing one setscrew allows the clutch and the aligning roller (lower) to be disassembled, respectively. Also, the aligning roller (upper) can be removed.



- Notes:** 1. During disassembly, be careful not to damage the mylar.
2. Pay attention to the orientation of the clutch projection.



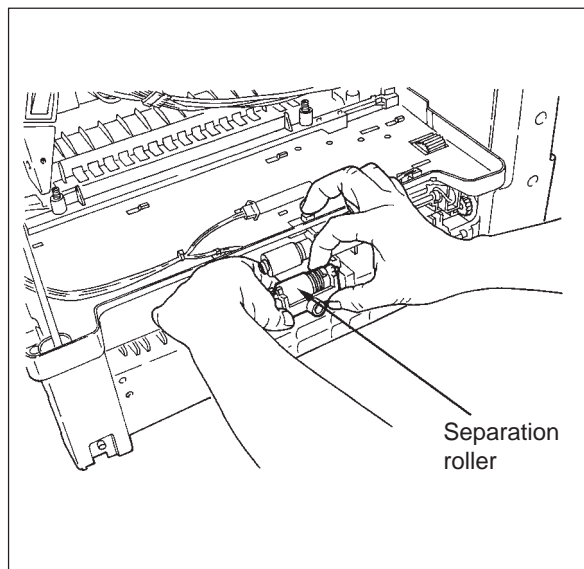
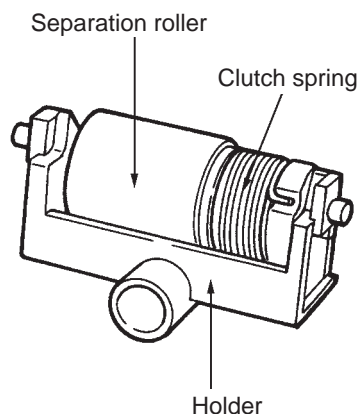
8.3.2 Lower paper feed unit

- (1) Pull out the cassette.
- (2) Remove the upper paper feed unit.
- (3) Remove the feed side cover and right side covers (lower, upper).

Note: Be careful not to lose the spring.

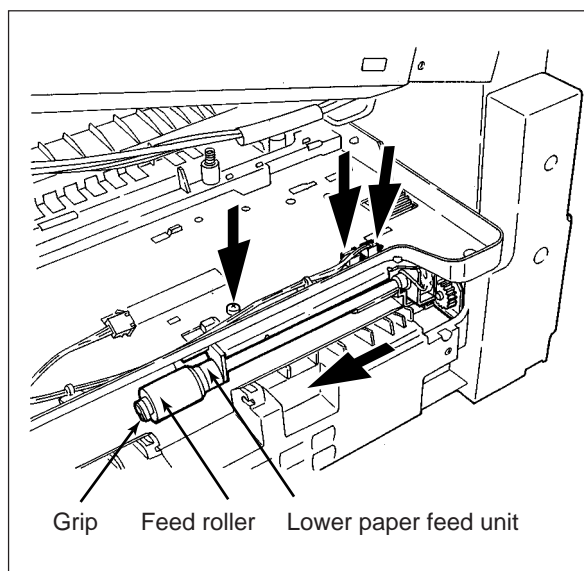
- (4) Remove the separation roller.

The roller unit can be removed by pulling it toward you.



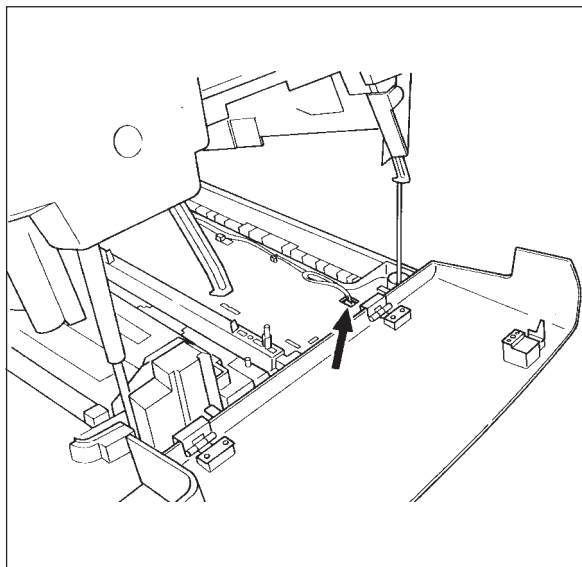
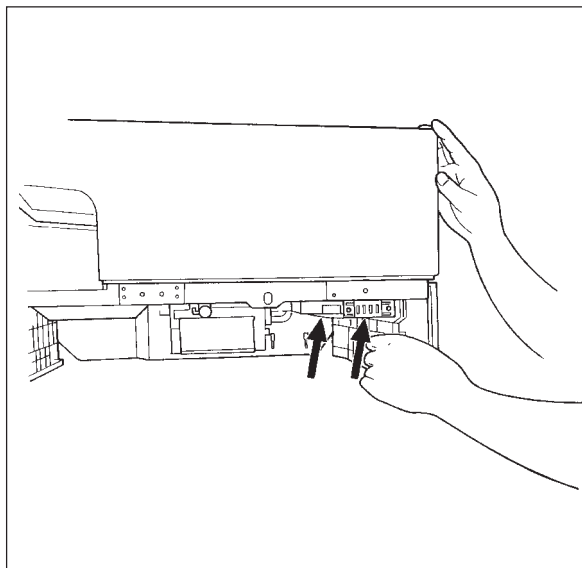
- (5) Disconnect two connectors and remove one screw. Slide the whole unit toward the front, then lower it and pull it out toward you.

Note that the feed roller can be removed without taking out the whole unit. Just remove the grip and pull out the roller from its shaft.

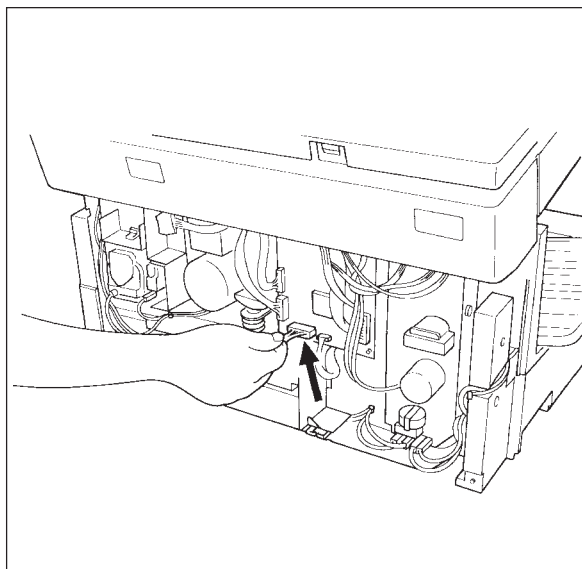


Empty switch:

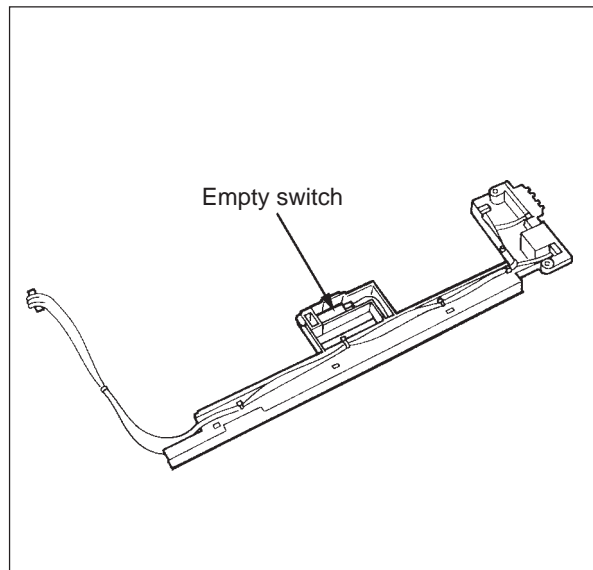
- Remove the rail unit (2 screws and a connector).



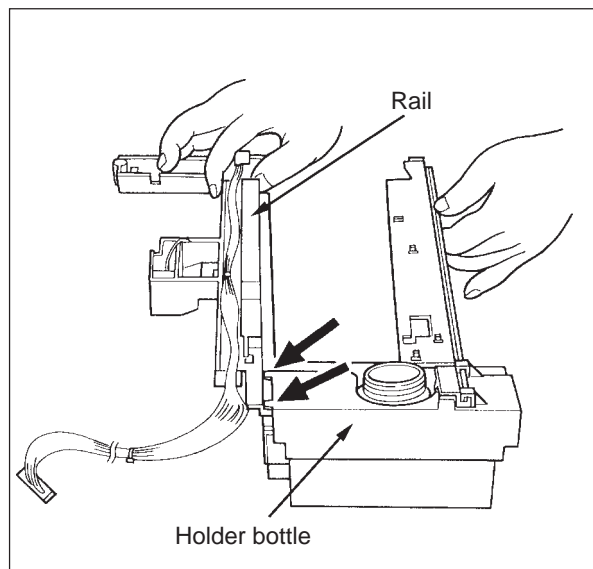
- Slide the rail unit toward the front and lower it to remove.
- Remove the rear cover and disconnect one connector from the logic PC board. Take the connector out through the window in the rear frame to the front side.

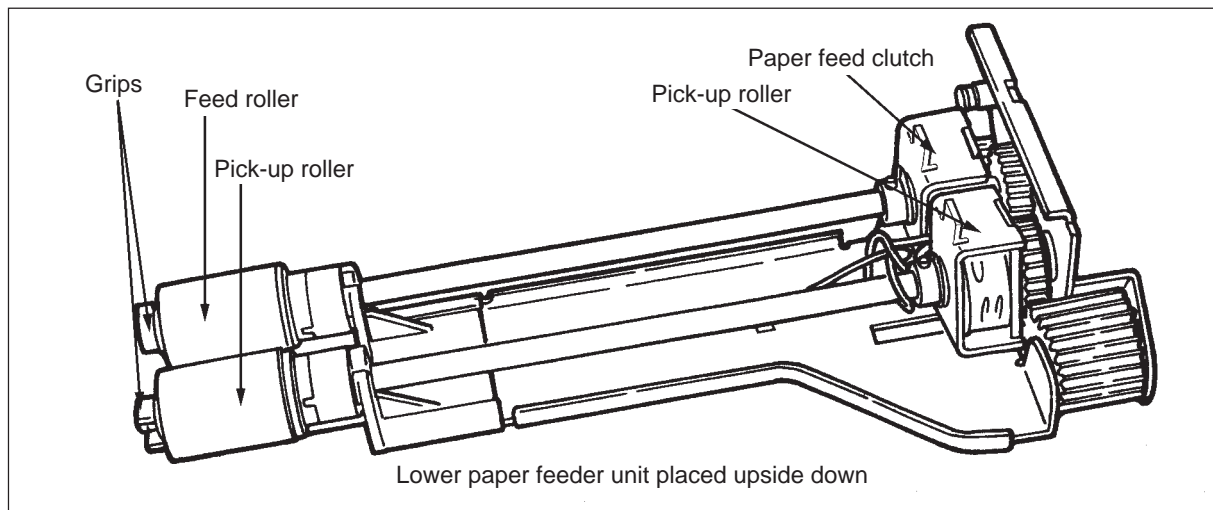


- After pulling out the whole unit to the front side, remove one claw and raising the switch, disconnect the connector.



Note: When reassembling the rail unit, make sure that the holder bottle is placed on the rail.



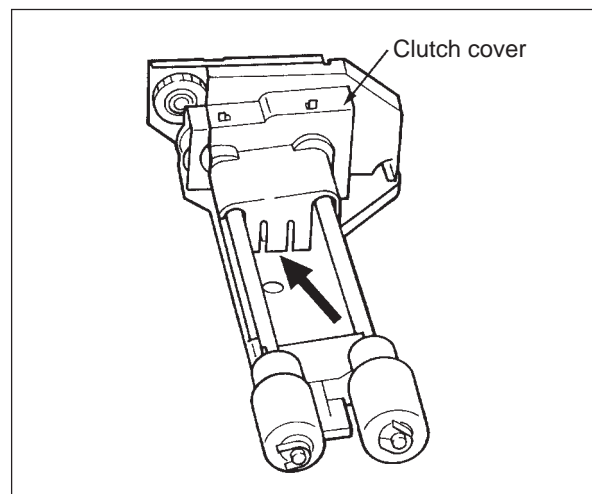


Pick-up roller and feed roller:

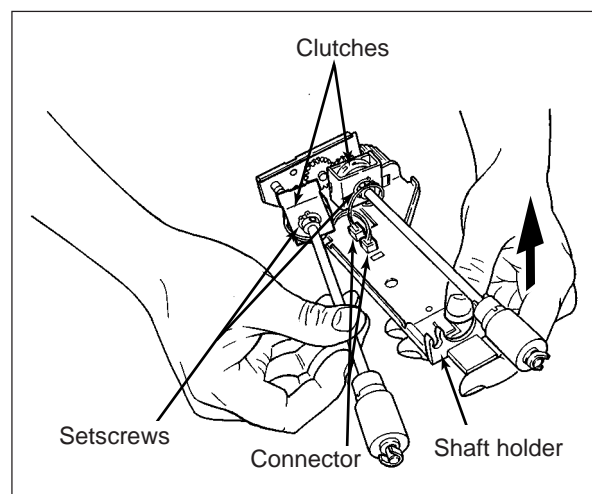
- Snap off the grips and pull out each roller from its shaft. Note that the pick-up roller and the feed roller are the same parts.

Pick-up roller clutch and feed roller clutch:

- Disengage one claw to remove the clutch cover.

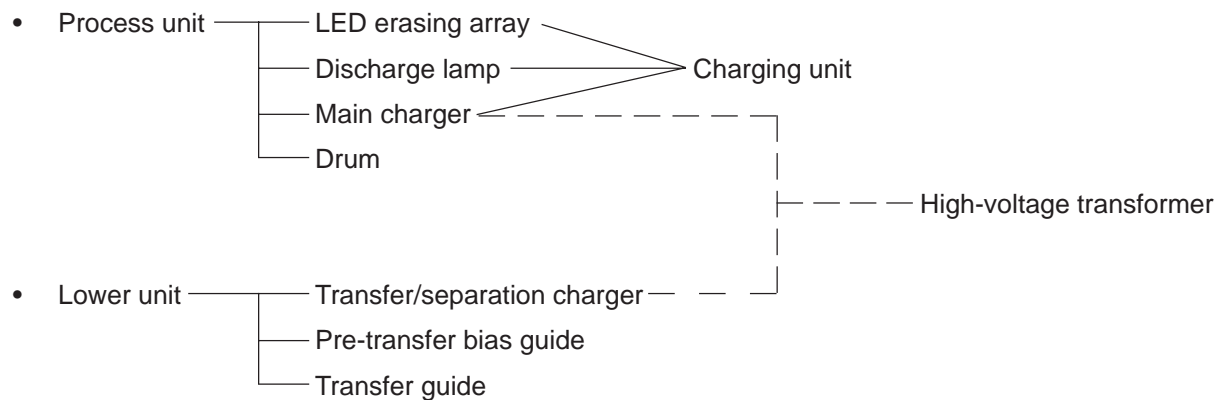
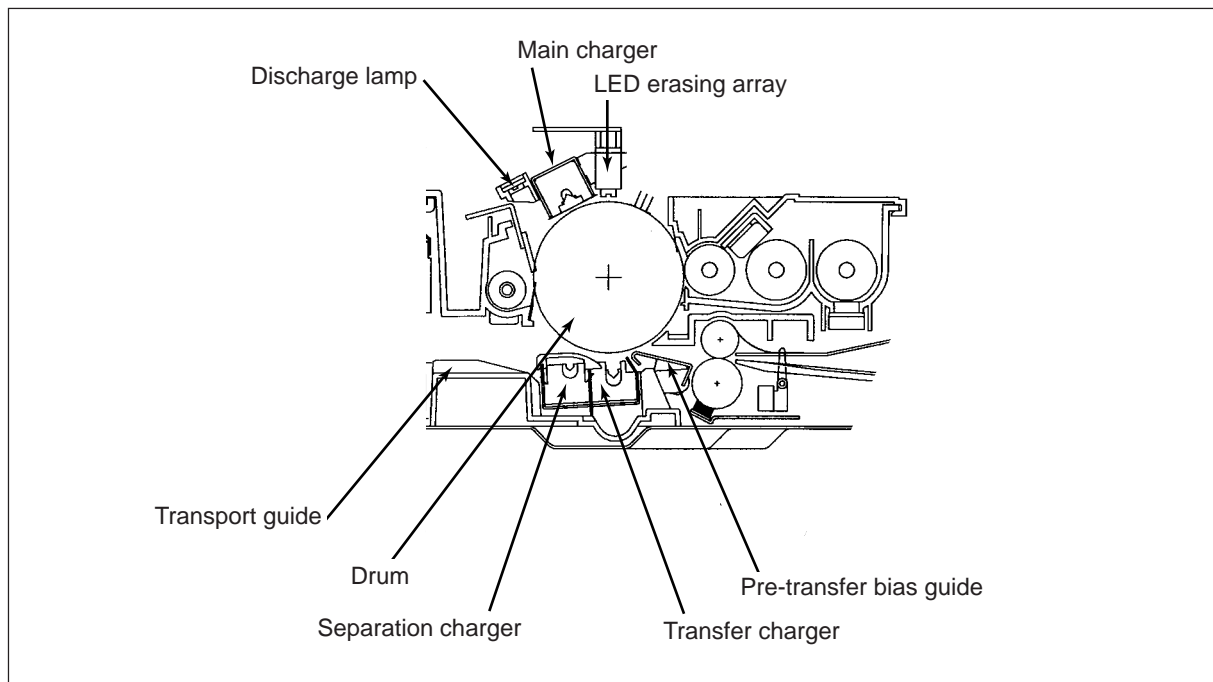


- While lifting each shaft in the direction of the arrow, remove each clutch from the shaft holder.
- Disconnect the connector from the bracket.
- Removing one setscrew allows the clutch and the shaft to be separated.
- The pick-up roller clutch and the feed roller clutch are the same parts.



9. DRUM-RELATED SECTION

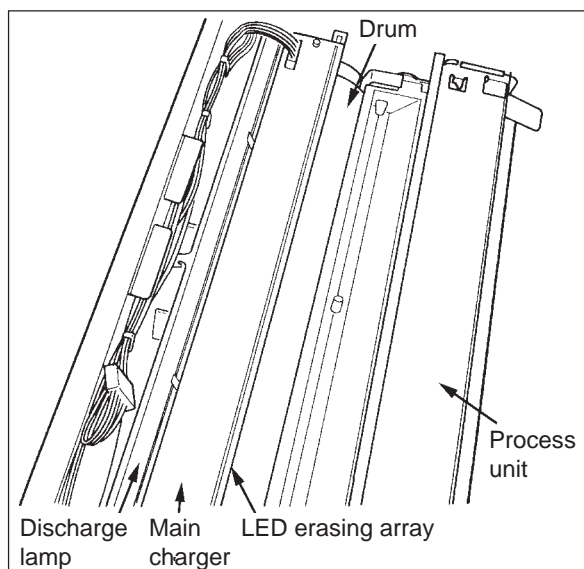
9.1 Construction



9.2 Explanation of Functions

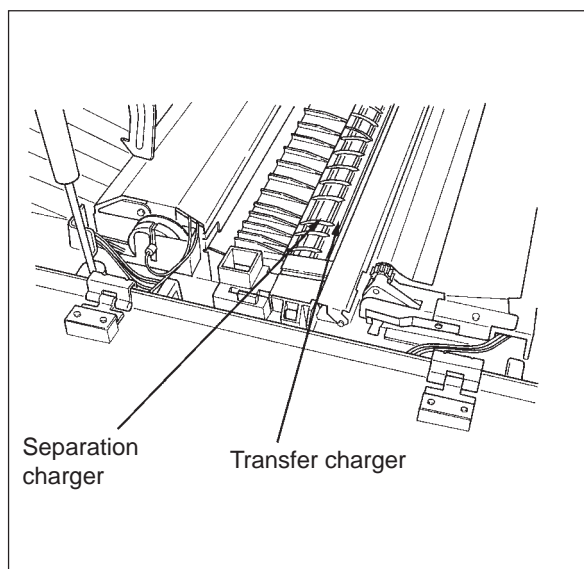
9.2.1 Main charger, discharge lamp and LED erasing array

- Main charger
Places a negative charge on the drum (through a high-voltage transformer).
- Discharge lamp
Eliminates the residual charge on the drum after cleaning.
- LED erasing array
Erases the unnecessary parts of the latent image formed on the drum.



9.2.2 Transfer/separation chargers

- Transfer charger
Helps transfer the toner image on the drum to the copy paper (through a DC high-voltage transformer).
- Separation charger
Strips the copy paper along with the toner image from the drum (through an AC high-voltage transformer).

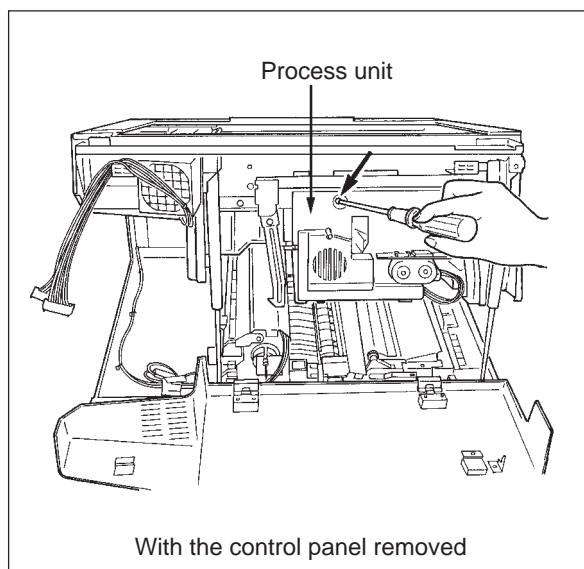


9.3 Disassembly and Replacement

9.3.1 Process unit

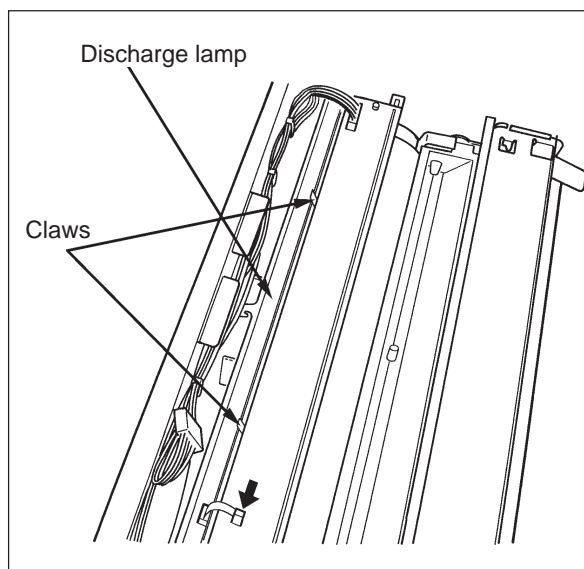
- (1) Remove the toner cartridge.
- (2) After removing one screw, pull out the entire unit to the front and take it out.

Notes: 1. When pulling out the unit, be careful not to touch the drum.
2. In order not to damage the drum, place the unit on the flat surface of a stand.



9.3.2 Discharge lamp

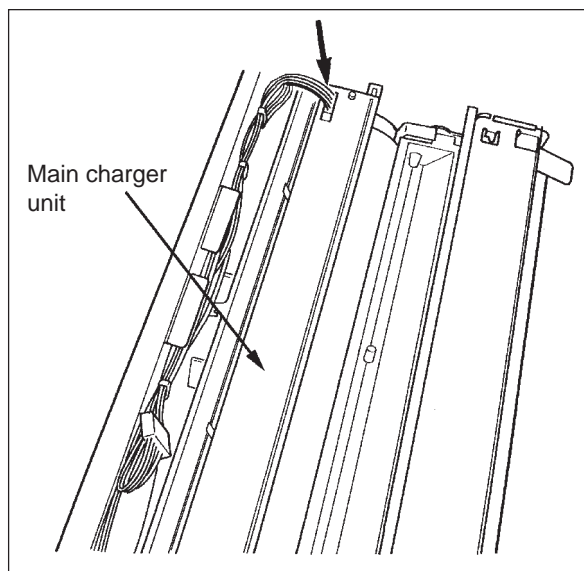
- (1) Remove the process unit.
- (2) Disconnect a connector.
- (3) Disengage two claws and take out the PC board.



9.3.3 Main charger unit

- (1) Remove the process unit.
- (2) Disconnect the one connector.
- (3) Move the entire unit toward the upper to have it disengaged for the rear lock and take it out.

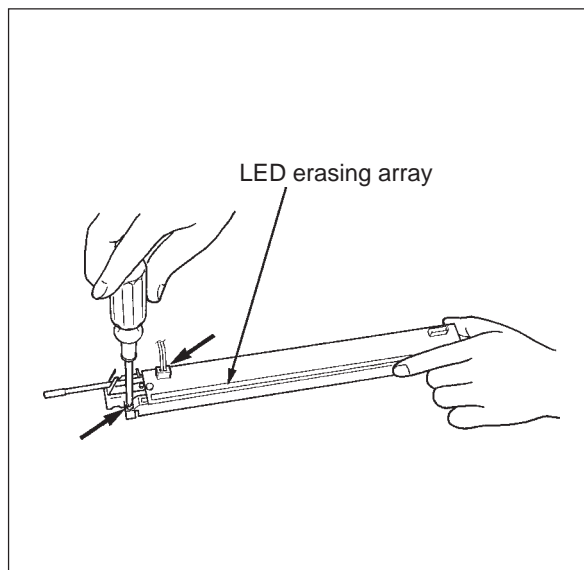
Note: Be careful not to damage the drum.



Front side

9.3.4 LED erasing array

- (1) Remove the main charger unit.
- (2) Remove a connector.
- (3) Remove a screw.



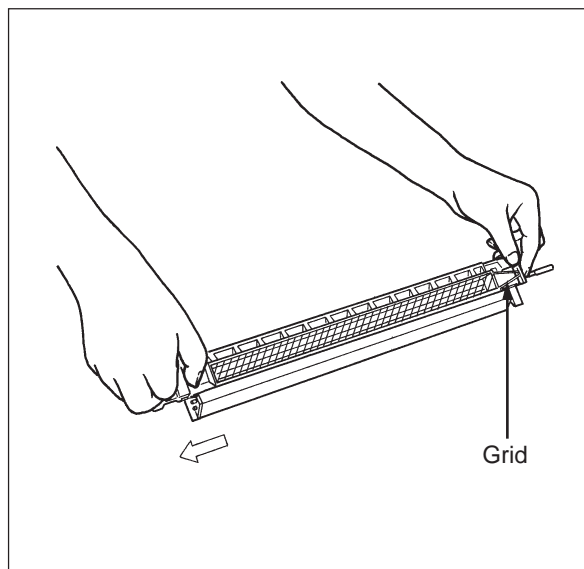
9.3.5 Main charger

- (1) Remove the main charger unit.

Grid

- Remove the grid by pulling it toward the rear.

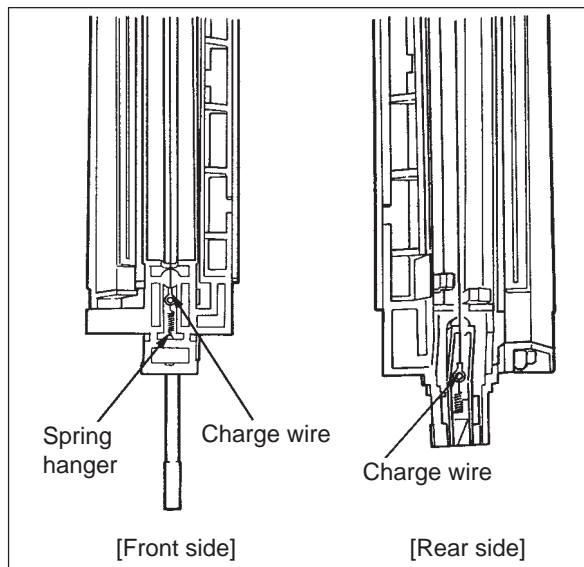
Note: Be careful not to touch the shaded area with a bare hand.



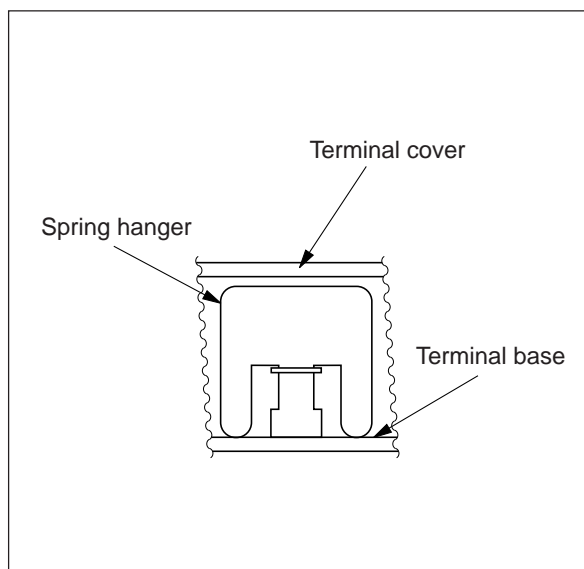
Charge wire

(Entire length: 353 mm; tungsten wire: 0.06 mm dia.)

- Remove the front and rear terminal covers.
- Pinching the hook of the rear terminal cover with cross pliers etc. will facilitate the removal.

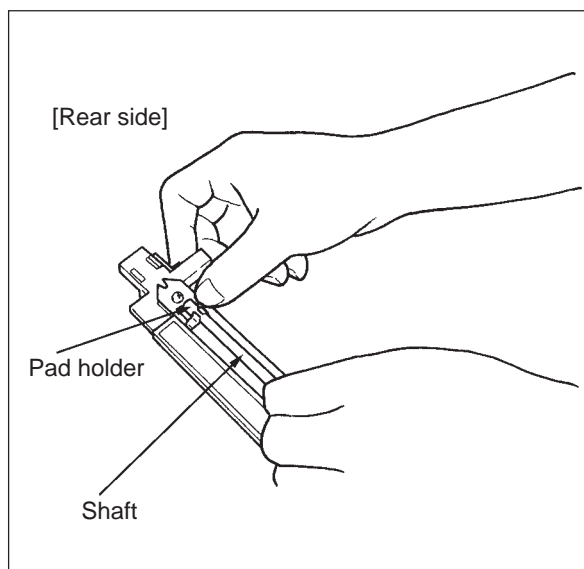


- Notes:**
1. Pay attention to the direction in which the spring hanger on the front faces.
 2. The charge wire should be placed securely in the V-grooves on the front and rear sides.
 3. Don't allow the wire to kink.
 4. Don't touch the wire with a bare hand.

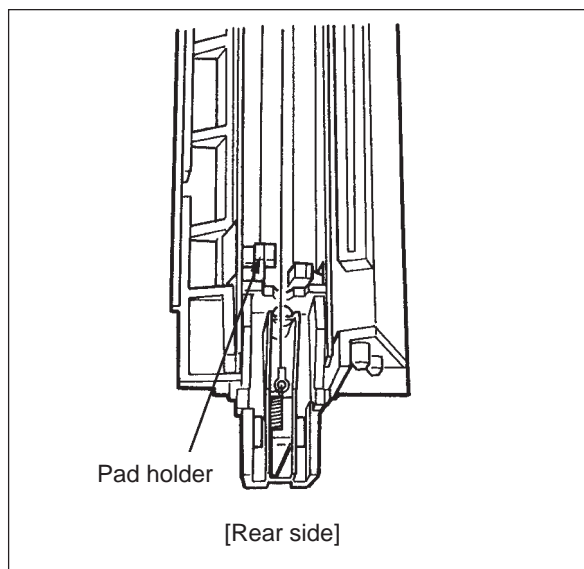


Replacing the cleaning pad:

- (1) Remove the charge wire.
- (2) Remove the LED erasing array.
- (3) Move the cleaning pad to the rear side.
- (4) Remove the pad holder snap from the shaft.

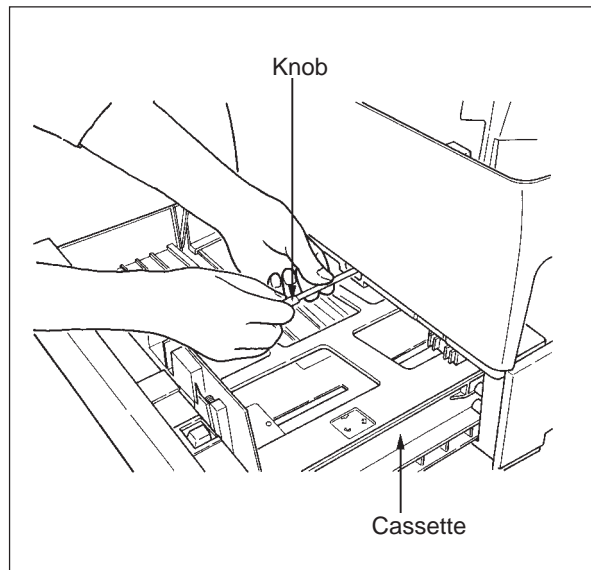


- Notes:**
1. When reassembling, pay attention to the direction of the pad holder in which it faces.
 2. When moved to the rear, the pads (2 pcs.) should be obviously away from the wires.



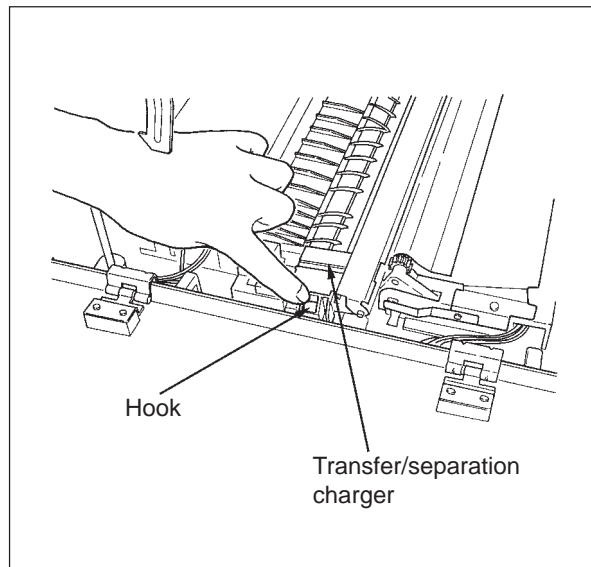
9.3.6 Transfer/separation chargers

- (1) Pull out the cassette.
- (2) Remove the knob for the cleaning-pad shaft.



- (3) After opening the front cover, remove the hook and then take out the entire unit.

Note: When reinstalling the transfer/separation charger, be sure to fit it into the rear terminal guide. Since the charger is pushed up by a spring, make sure that it moves up and down freely.

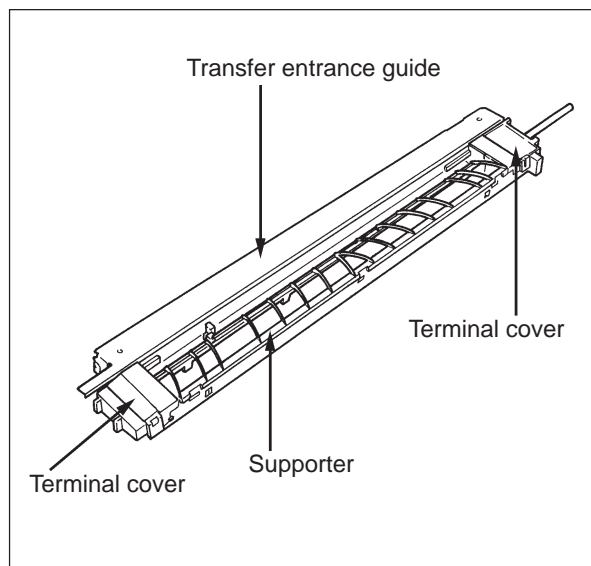


Replacing the charge wire:

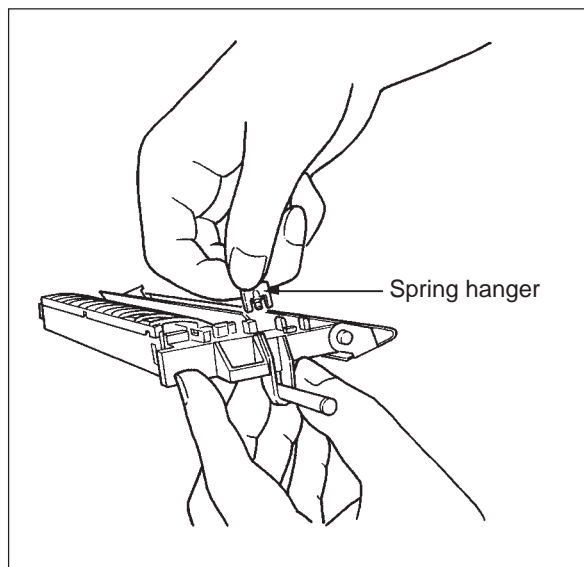
(Entire length: 353 mm; tungsten wire: 0.06 mm dia.)

- Disengage the claw of the transfer entrance guide from the rear side.
- Remove the front and rear terminal covers. For the separation charger, remove the supporter in addition.

Note: For replacing the cleaning pad, the same procedure as for the main charger applies.

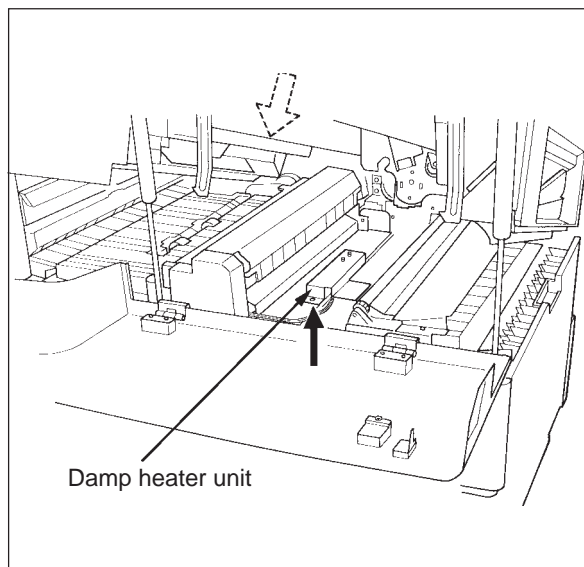


- Notes:**
1. Pay attention to the direction in which the spring hanger on the front faces.
 2. The charge wire should be placed securely in the V-grooves on the front and rear sides.
 3. Don't allow the wire to kink.
 4. Don't touch the wire with a bare hand.
 5. The supporter should be fitted securely in the hook and groove.



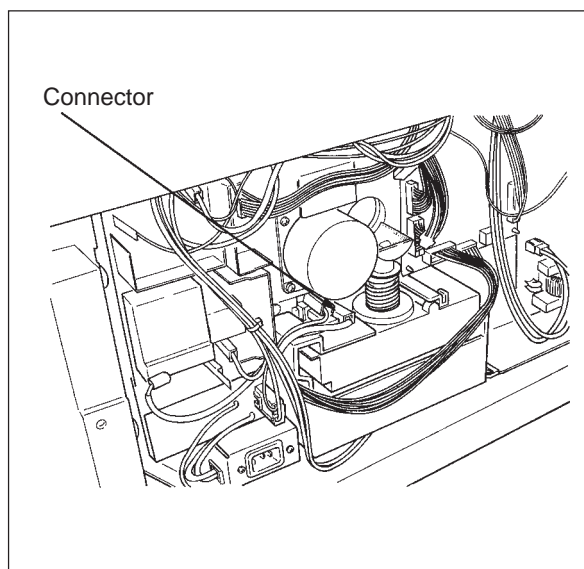
9.3.7 Damp heater unit (Option)

- (1) Remove the transfer/separation charger.
- (2) Remove the transport guide (one screw).
- (3) Remove one screw securing the damp heater.
- (4) Remove the inner cover (lower left) and left-side cover (lower).
- (5) Remove the rear cover.
- (6) Remove a connector.



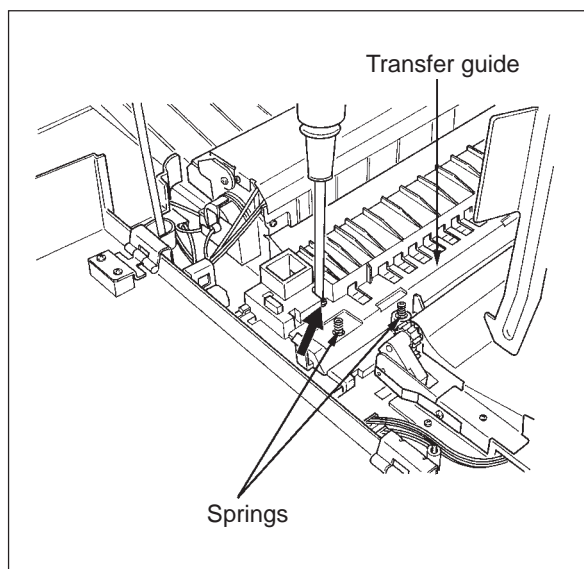
9.3.8 Transfer/separation terminal

- (1) Remove the transfer/separation charger.
- (2) Remove the rear cover and disconnect three connectors.

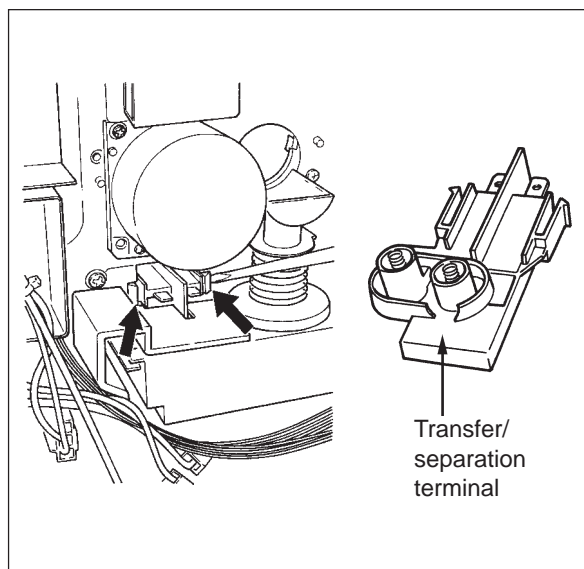


- (3) Remove one screw.
- (4) Pull the transfer guide toward the front slightly and lift it out.

Note: Be careful not lose the charger push-up spring.

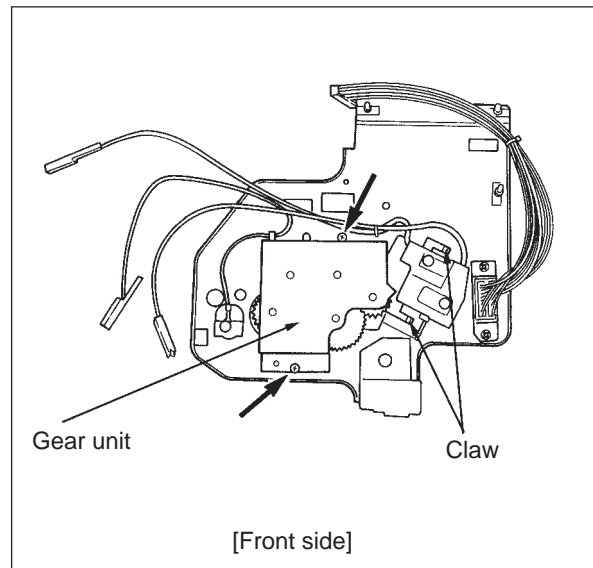


- (5) Remove the two hooks and then take out the transfer/separation terminal from the front side.

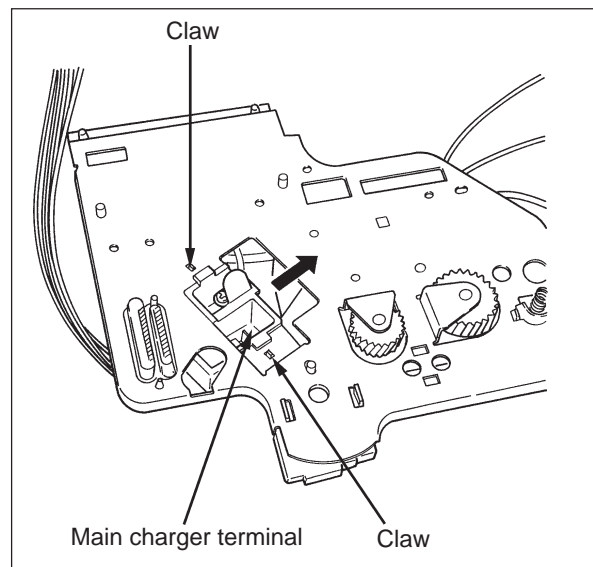


9.3.9 Main charger terminal

- (1) Remove the drive unit.
- (2) Remove the gear unit (2 screws).



- (3) After removing the two claws on the front side, slide out the main charger terminal to the right.

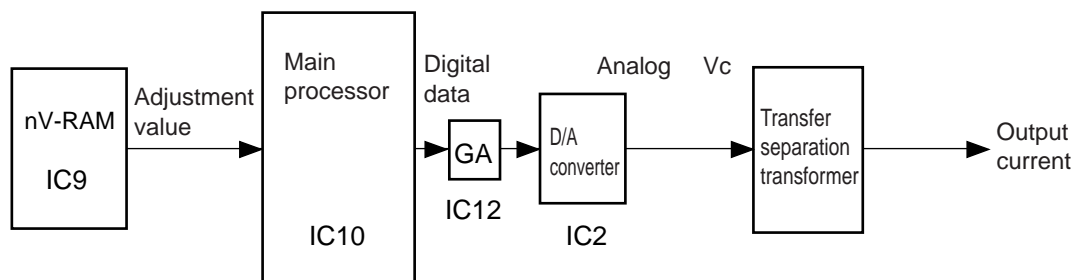


9.4 Transfer/Separation Electric Current Control Circuit

(1) Brief description

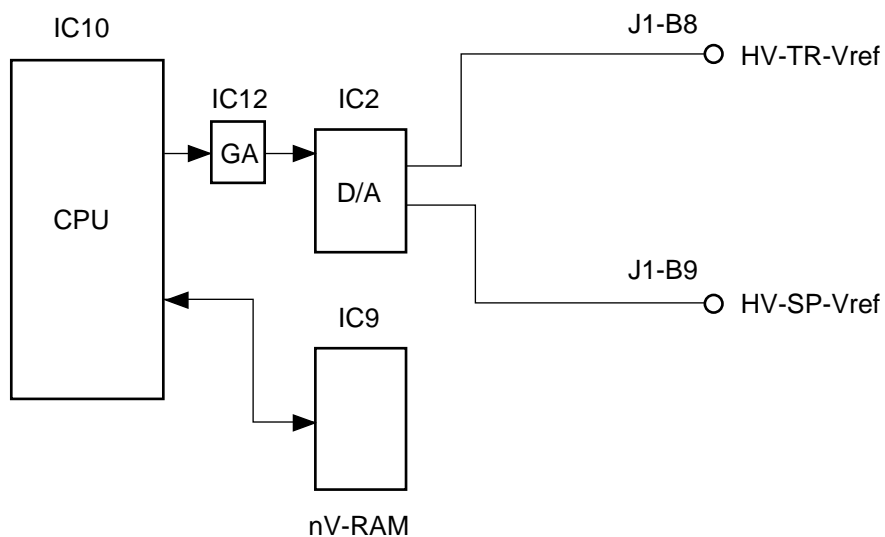
- The circuit generates voltage V_c for transfer and separation output current control.
- Change $V_c \rightarrow$ changes output current to linear.

(2) Description of operation



- Transfer/separation output adjustment value in nV-RAM is fed to main processor.
- ↓
- The main processor outputs control voltage data through the GA to D/A converter.
- ↓
- Analog conversion made by D/A converter.
- ↓
- Control voltage is fed to transfer/separation transformer.
- ↓
- Transfer/separation transformer generates output current which is proportional to control voltage V_c .

* Adjustment of control voltage V_c (alteration of adjustment data) must be made in AJ mode.



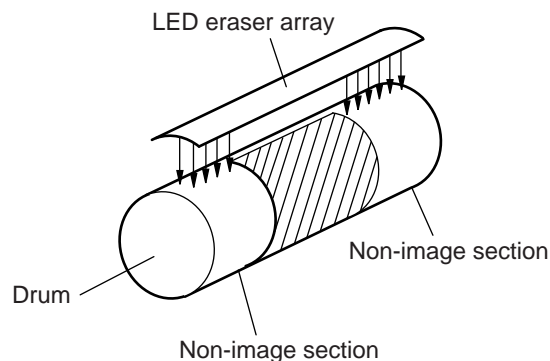
Transfer/separation control circuit diagram

9.5 LED Eraser Array

Brief description

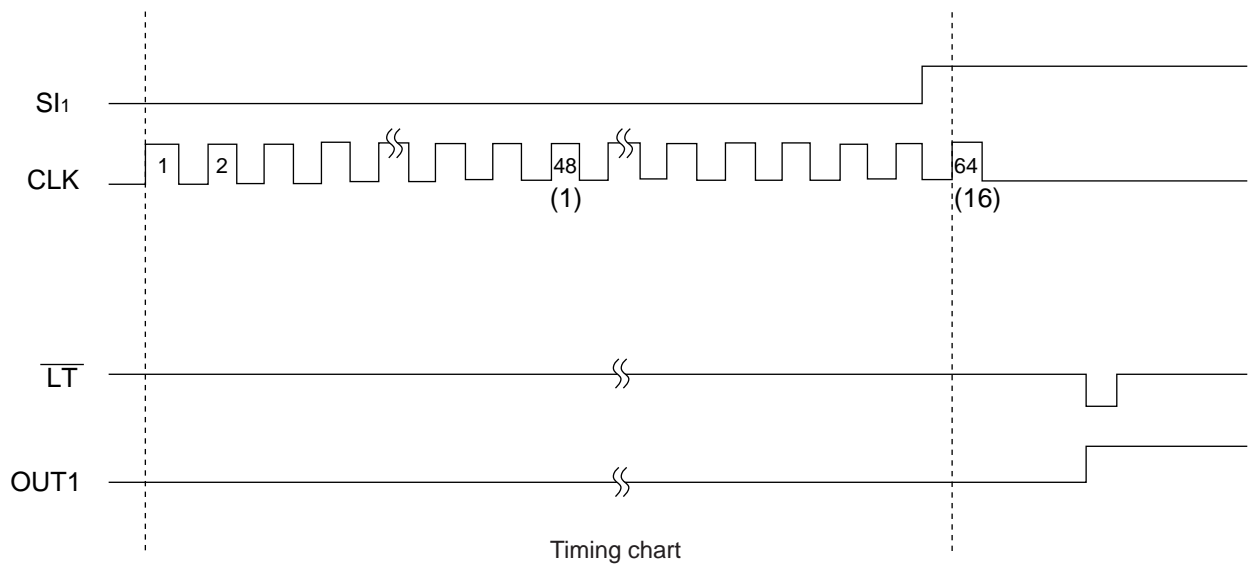
- LED eraser array:
 - For reduction copying, the areas on the drum where the light from the exposure lamp does not fall are exposed.
 - Exposes the portion, which is out of the paper size and unnecessary charged, according to the cassette size signal.

The LEDs are turned on and the drum surface is irradiated → the charge in the area hit by the light disappears from the drum surface → the image of the section where the light has fallen is therefore erased.

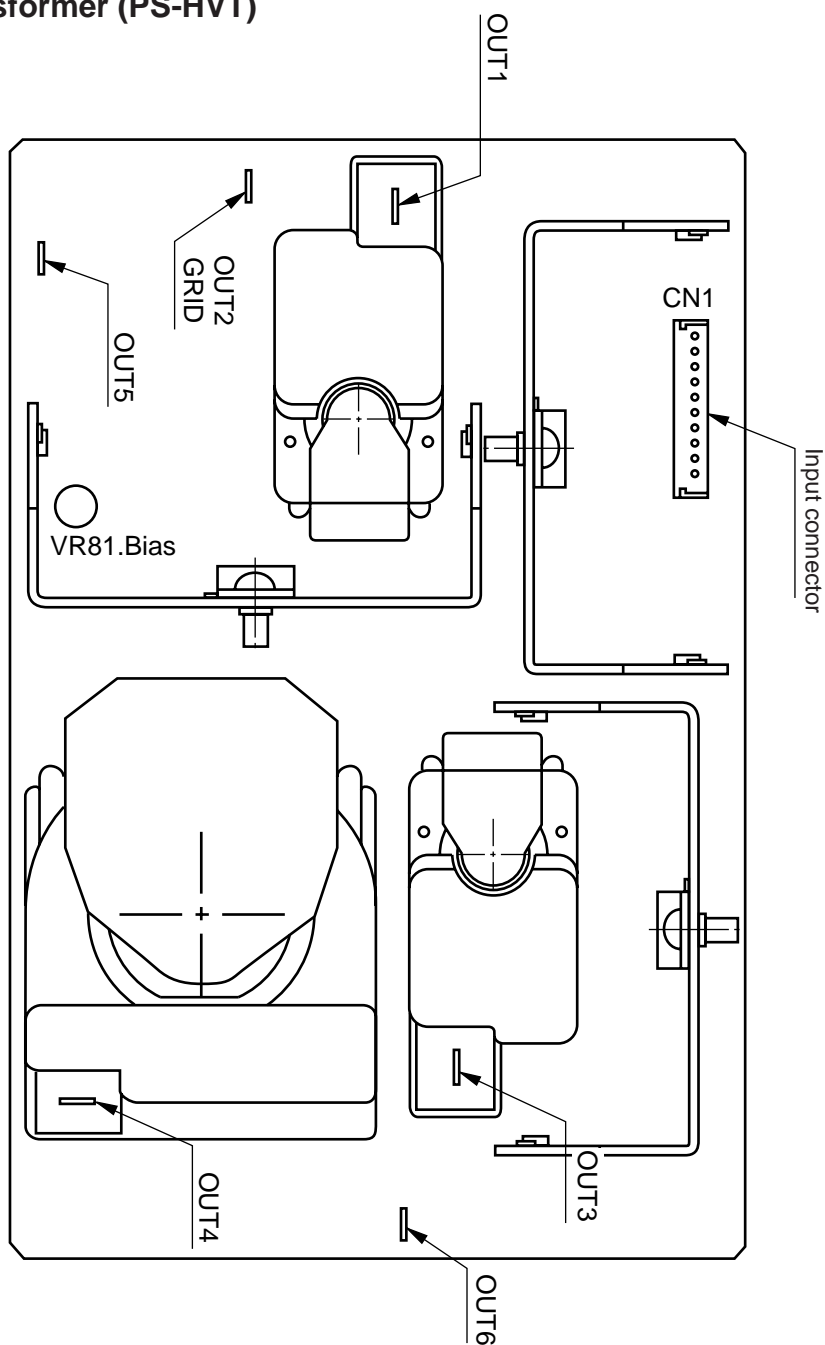


Operation description

- The LED eraser array consists of 32 LEDs, and the LEDs are in the same position in the front/rear direction based on the image center, are connected to the same bit in parallel.
- Data (according to input coordinate for paper size, reproduction rate) from the logic PC board are fed to LED eraser array by 64 bits (effective data are the last 16 bits).
Data "1": LED ON, Data "0": OFF (the level on the input pins of IC L7932 of the driver controller)
Ex.) When one LED is turned ON at both ends of LED array:
 - "1" is fed from logic PC board to the 64th (last) datum (16th effective datum), and "0" to data 1 – 63 (effective data 1 – 15).
↓
 - "1" is set in shift register equivalent to ED1 and ED32, and "0" is set for the others.
↓
 - After setting is completed, it is transferred to latch.
↓
 - According to the driver, turn ON LED on both ends in accordance with data.
A timing chart for the above is shown below.



9.6 High-Voltage Transformer (PS-HVT)



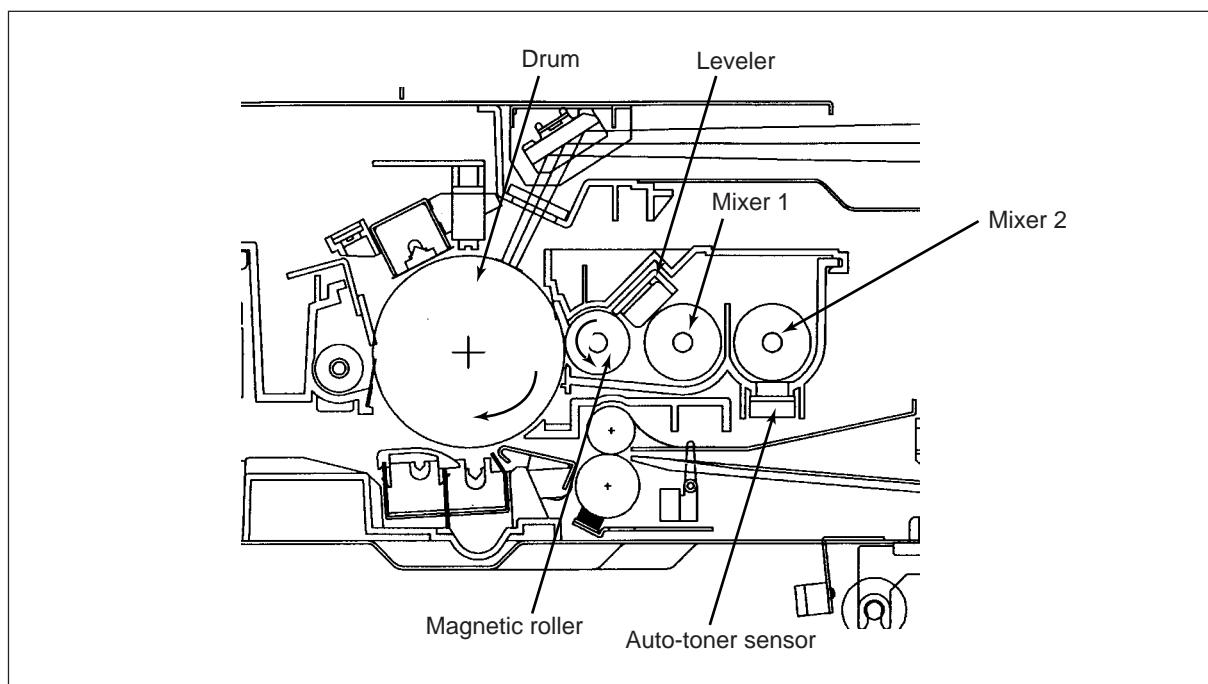
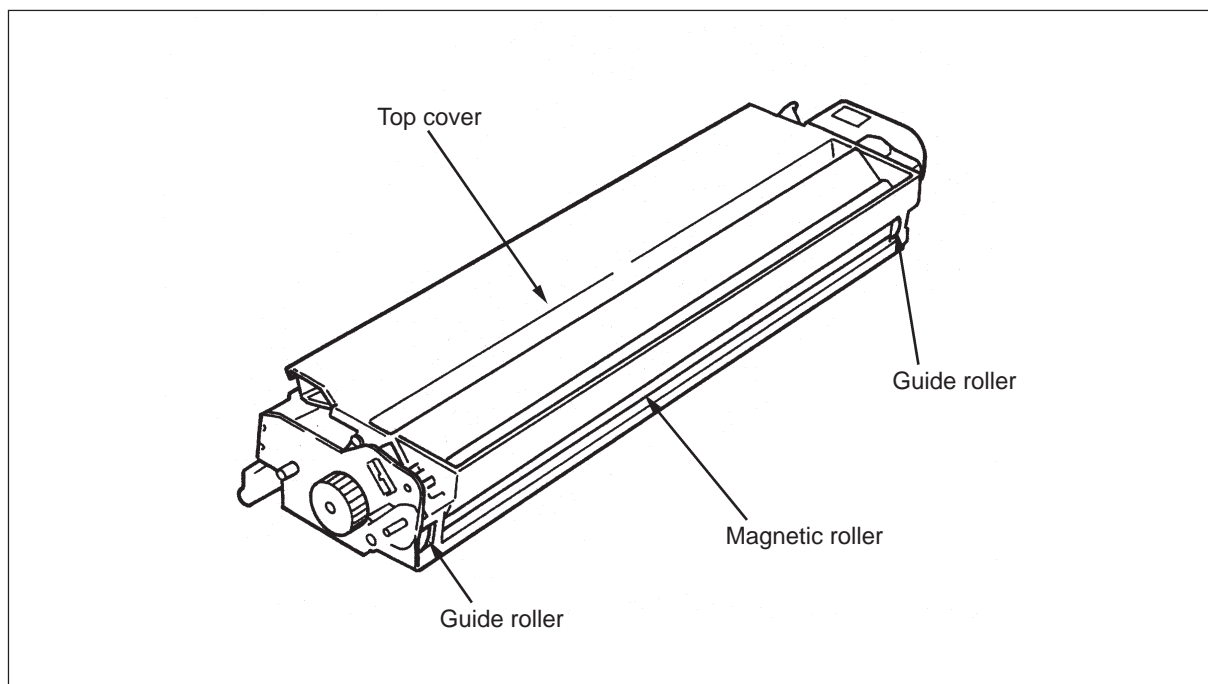
Input connector

Pin No.	Signal
1	M-VREF
2	HVT-M-ON
3	G-VREF
4	+24V
5	DG
6	HVT-TR-ON
7	TR-VREF
8	HVT-GB-ON
9	HVT-SP-ON
10	SP-VREF

Output 1	Charge	-500 μ A
Output 2	Grid	-692 V
Output 3	Transfer	-400 μ A
Output 4	Separation	AC 3.6 kV
Output 5	Developer bias	-200 V
Output 6	Guide bias	-1200 V

10. DEVELOPER UNIT

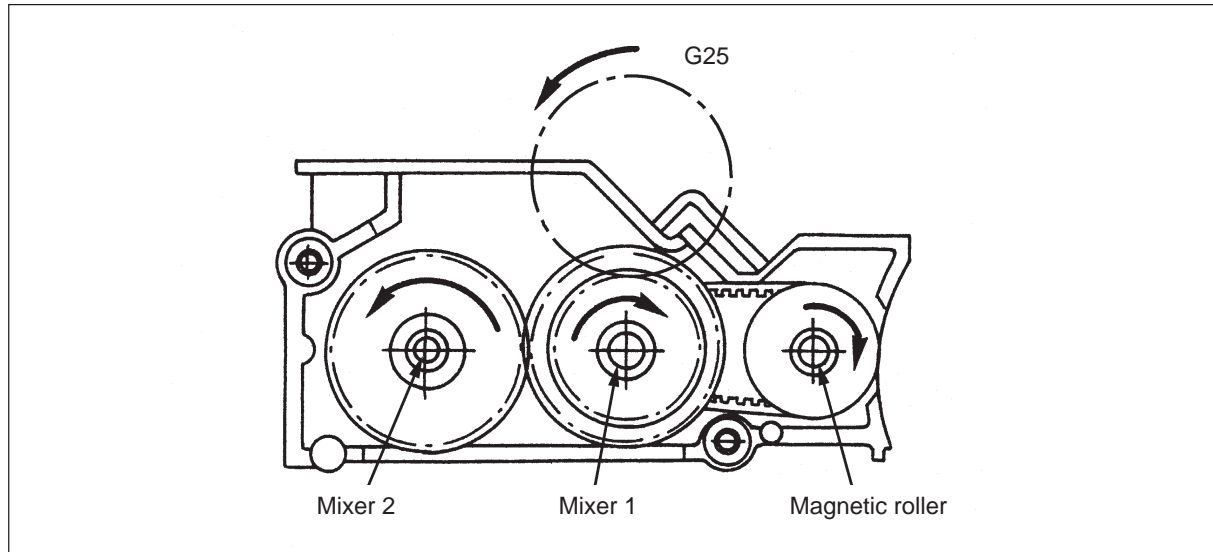
10.1 Construction



Front sectional view

10.2 Drive System

10.2.1 Magnetic roller, mixer 1 and mixer 2



[Rear side]

10.2.2 Toner cartridge

[Developer-unit front side]

Toner cartridge drive motor



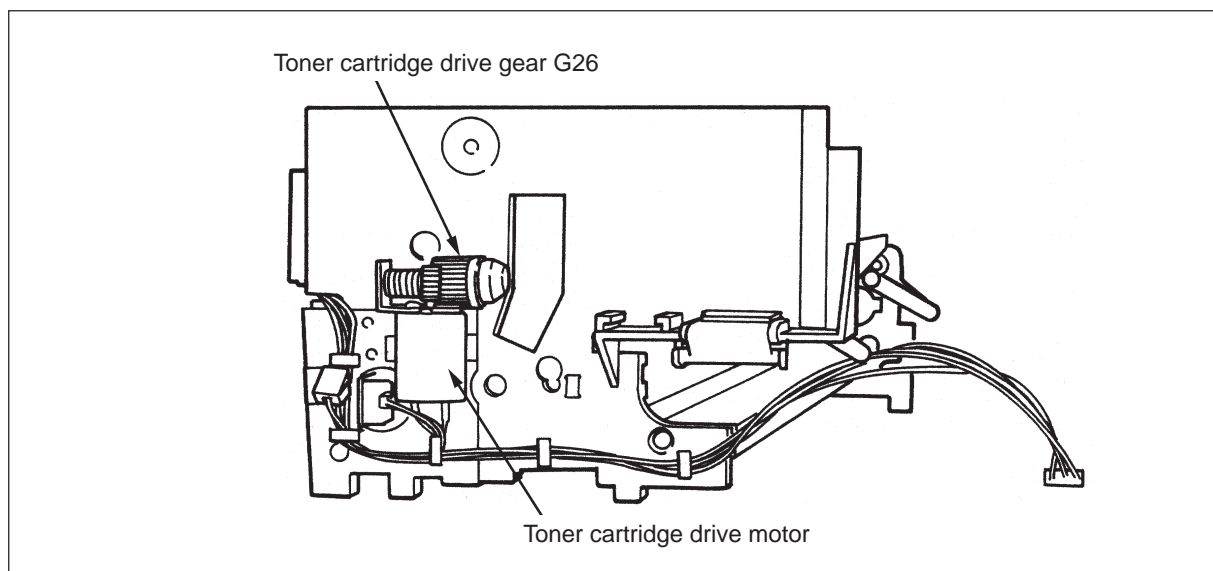
Drive gear (teeth: 26)



Toner cartridge (adding toner)



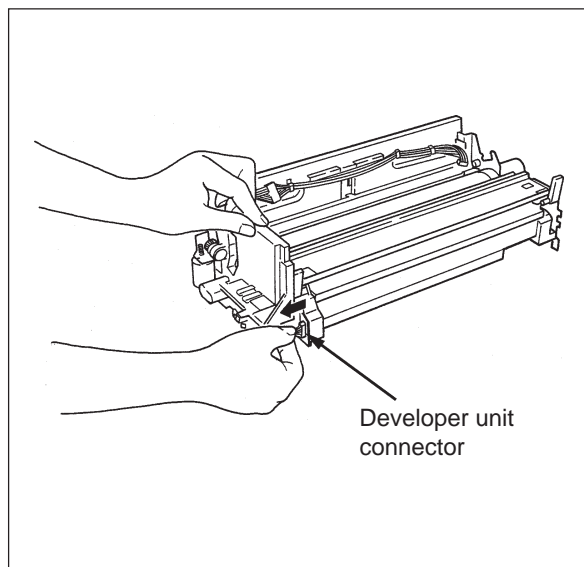
Toner is mixed by mixers 1 and 2.



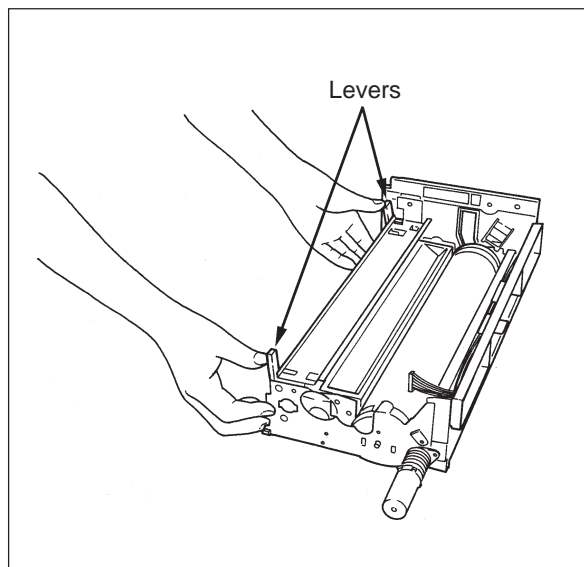
10.3 Disassembly and Replacement

10.3.1 Removal and installation of the developer unit

- (1) Remove the process unit.
- (2) Disconnect the developer unit connector.



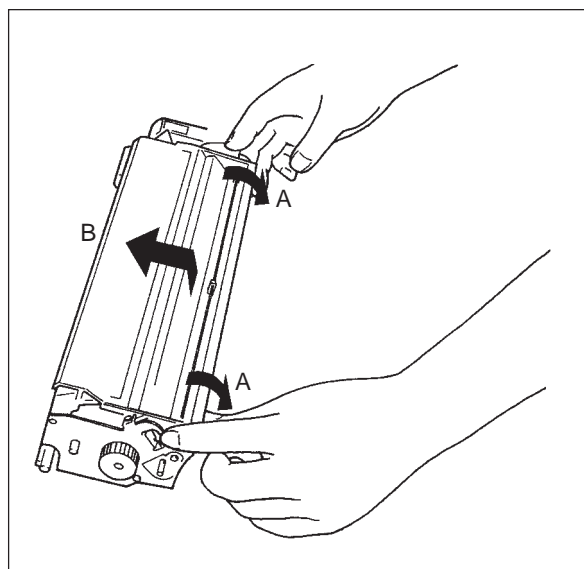
- (3) Lifting the levers, take out the developer unit.



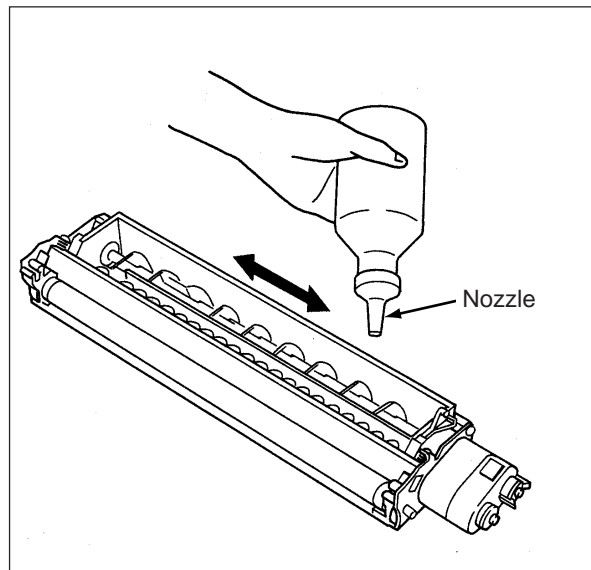
10.3.2 Installing the developer material

- (1) Remove the top cover (by rotating the two plate spring hooks in the direction of "A" and moving the cover in the direction "B").

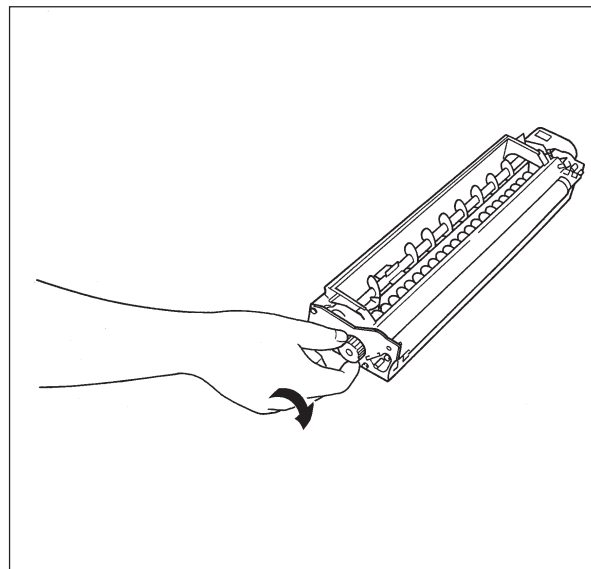
Note: While doing the above, be careful not to damage the seal affixed to the back side of the top cover.



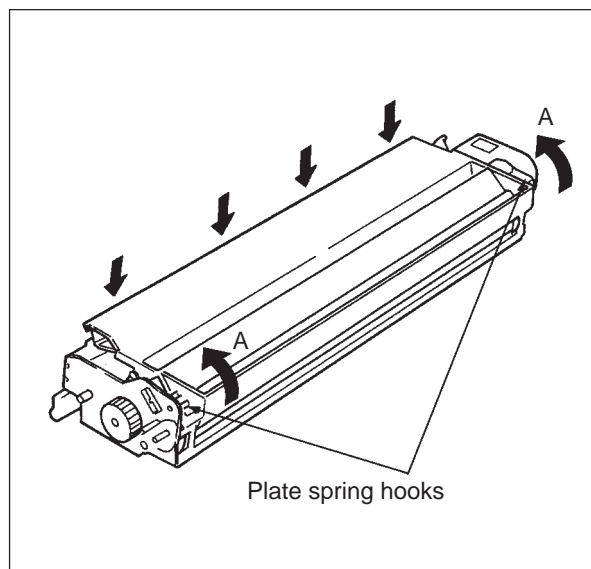
- (2) Remove the cap from the developer bottle and install the nozzle (service jig) to the bottle. Pour the developer material into the developer unit.



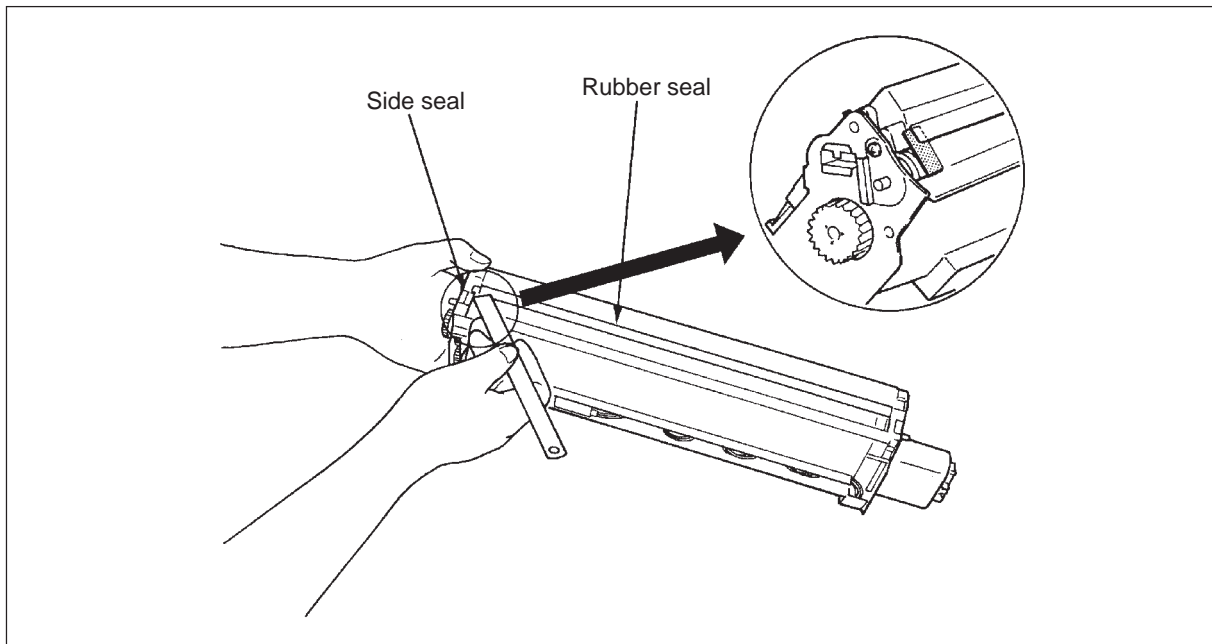
- (3) After pouring in the developer material, rotate the gear in the direction of the arrow as shown to deliver the developer material onto the magnetic roller.



- (4) Reinstall the top cover; after inserting the hooks (4 places) firmly, fix the plate spring hooks by rotating in the direction of arrow A securely.

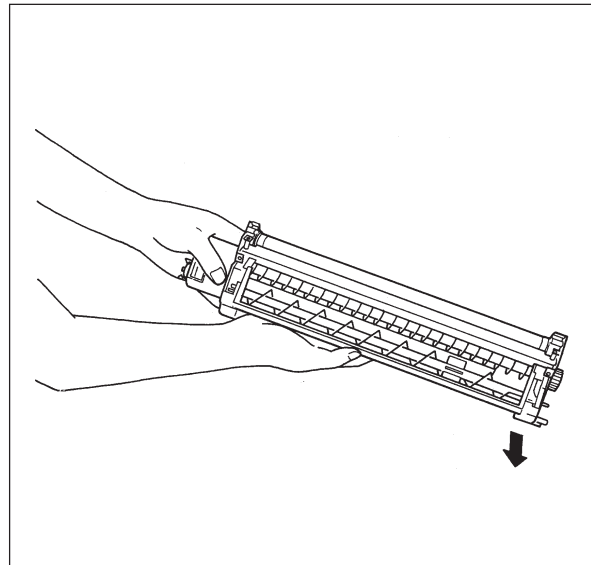


- (5) Pay special attention to the overlapping of the side shields (front and rear) and the rubber seal when installing the top cover; the rubber seal should be over the side seals.



10.3.3 Removing the developer material

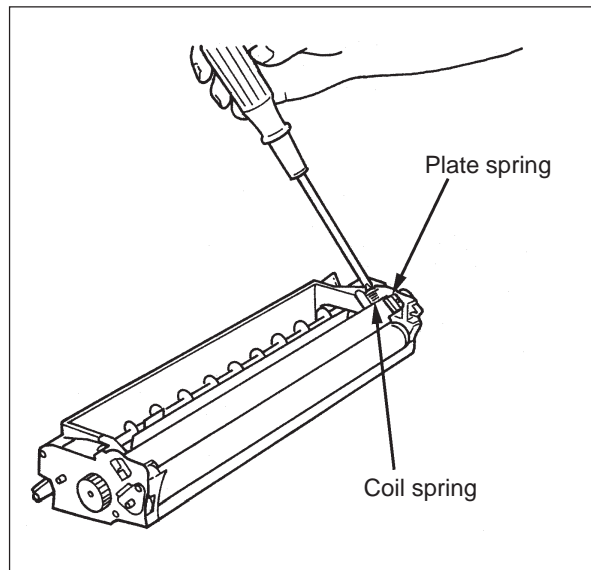
While tilting the developer unit, let the developer material drain out from the position shown with an arrow. Be careful not to allow gears and connectors nearby to get stained with developer material.



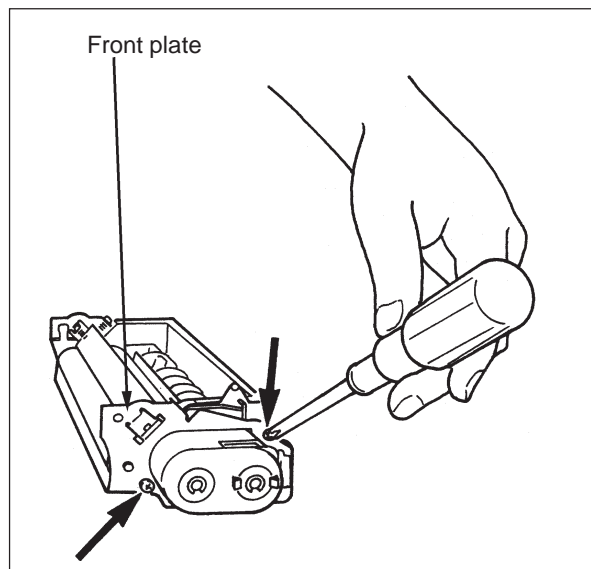
10.3.4 Guide rollers

Front side

- (1) Pour out the developer material from the developer unit.
- (2) Remove the leveler adjustment screw and the springs (a coil spring and plate spring) at the front.

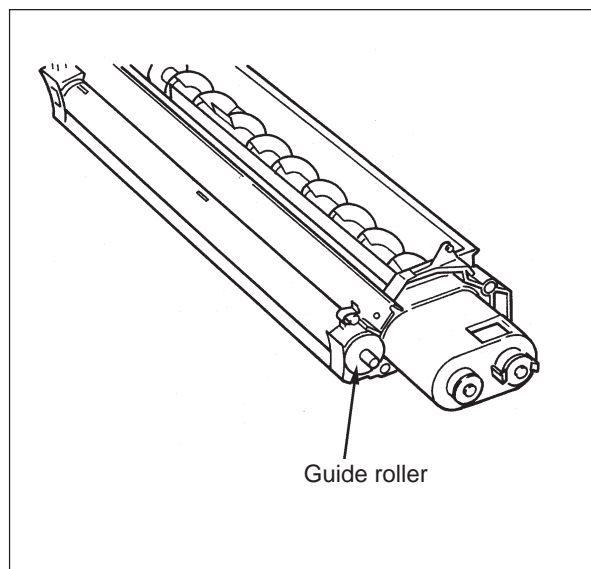


- (3) Remove the front plate (2 screws).



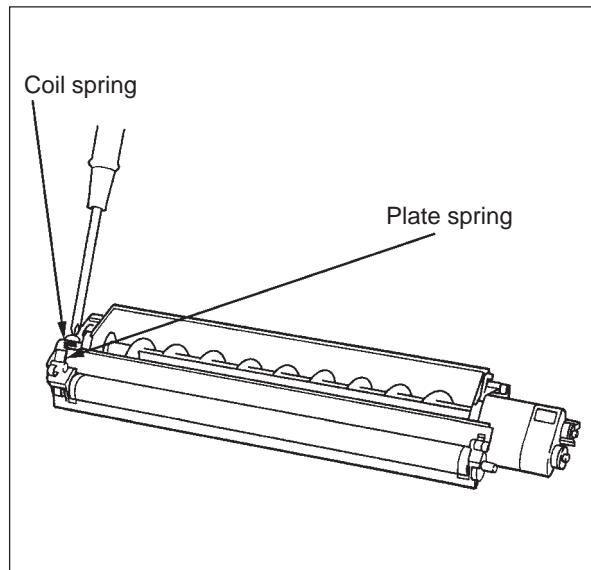
- (4) Replace the guide roller.

Note: When reinstalling the front plate, be careful not to allow the harness to be pinched.

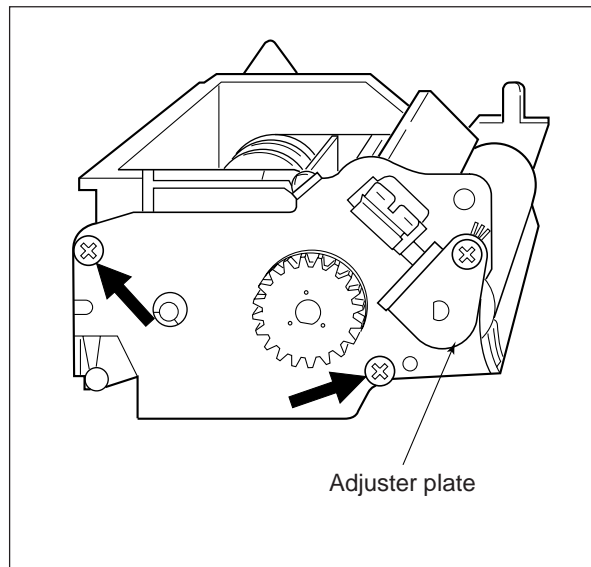


Rear side

- (1) Pour out the developer material (refer to para. 10.3.3).
- (2) Remove the leveler adjustment screw and the springs (a coil spring and plate spring) at the rear.

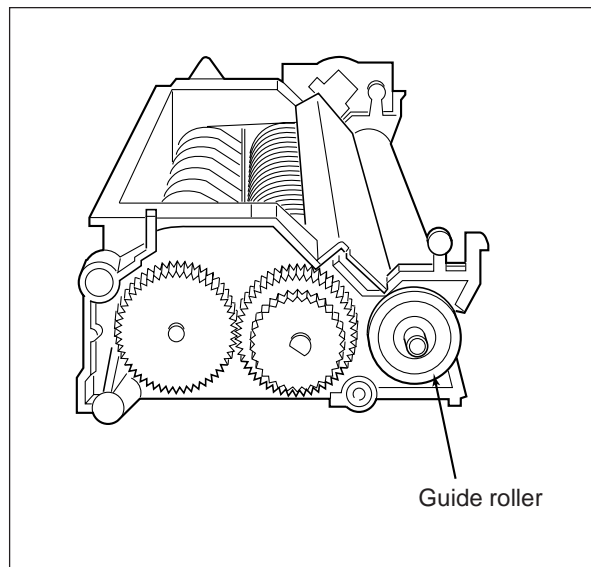


- (3) Remove the adjuster plate (1 screw).
(Before removing it, memorize its original position.)
Remove the rear plate (2 screws).



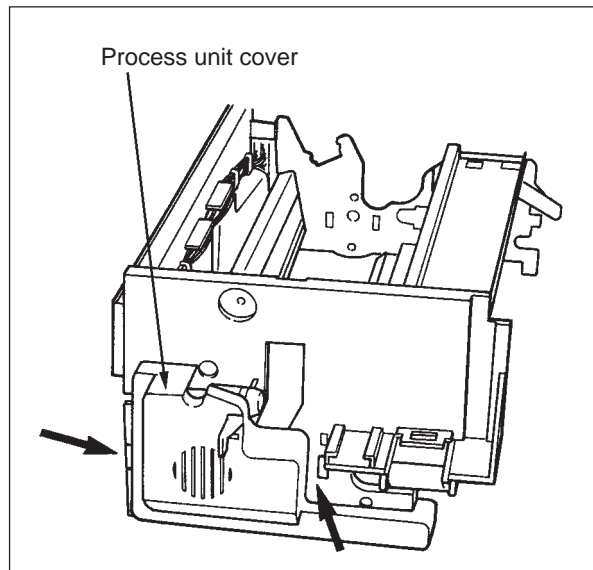
- (4) Replace the guide roller.

- Notes:**
1. The guide roller is common for the front and rear sides.
 2. After reassembly, the doctor-to-sleeve gap and the pole position should be adjusted.

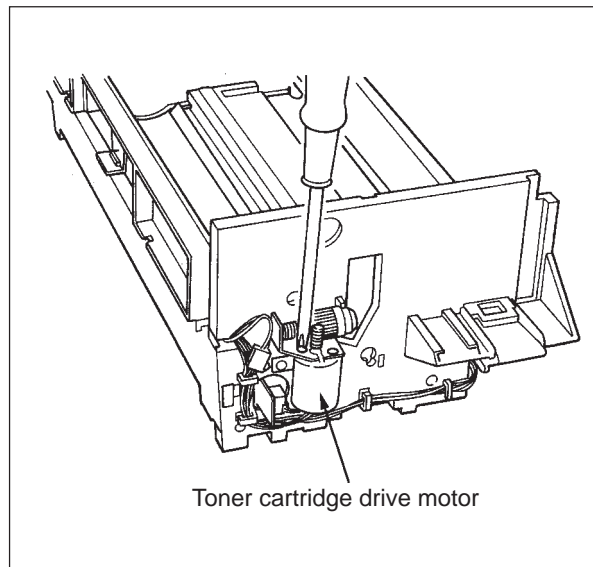


10.3.5 Toner cartridge drive motor

- (1) Remove the process unit.
- (2) Remove the process unit cover (2 claws).

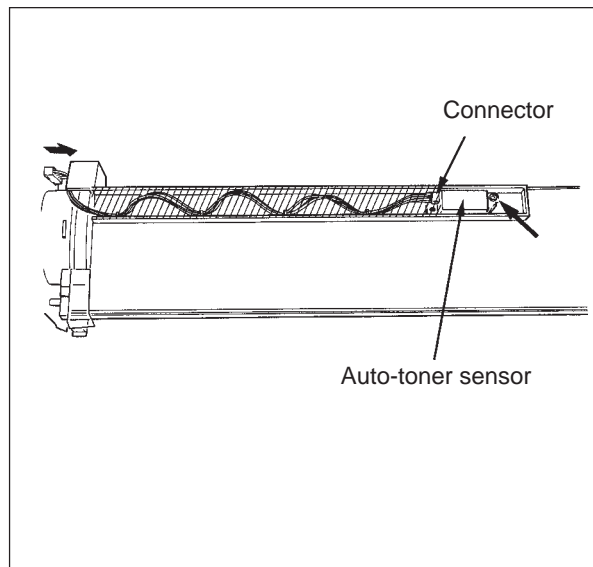


- (3) Take out the toner-cartridge drive motor (1 screw and connector).



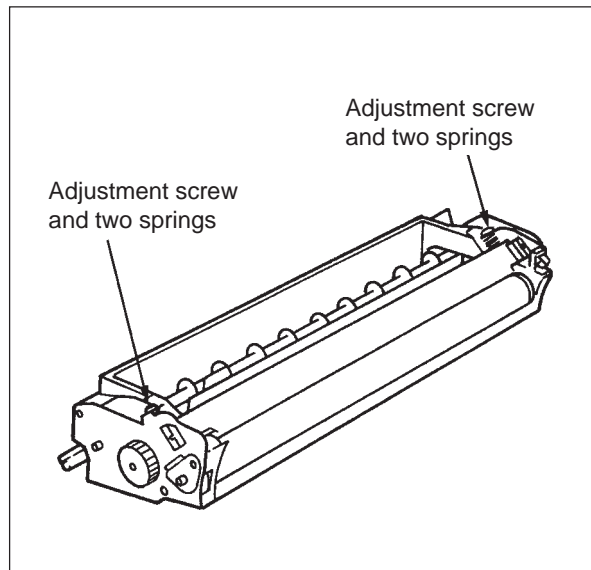
10.3.6 Auto-toner sensor

- (1) Pour out the developer material from the developer unit.
- (2) Place the developer unit upside down and remove the auto-toner sensor (1 screw and connector).

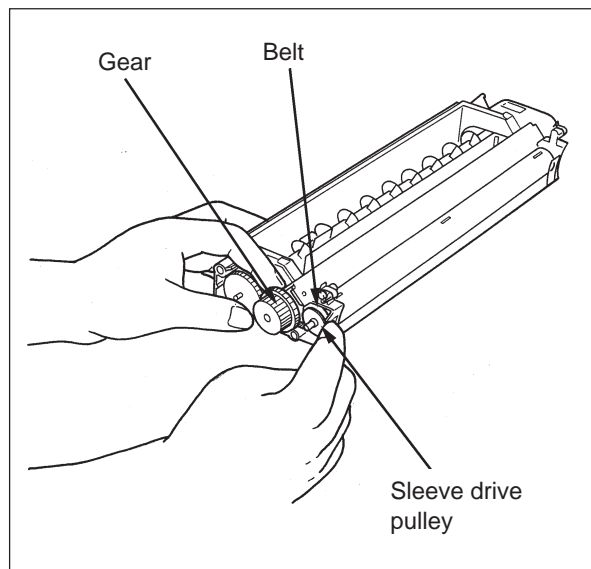


10.3.7 Magnetic roller

- (1) Pour out the developer unit from the developer unit. (Refer to para. 10.3.3.)
- (2) Remove the front plate and the guide roller. (Refer to 10.3.4 Para. Front side.)
- (3) Remove the adjustment plate, rear plate and guide roller. (Refer to 10.3.4 Para. Rear side.)
- (4) Remove the leveler (2 adjustment screws, 2 coil springs and 2 plate springs).

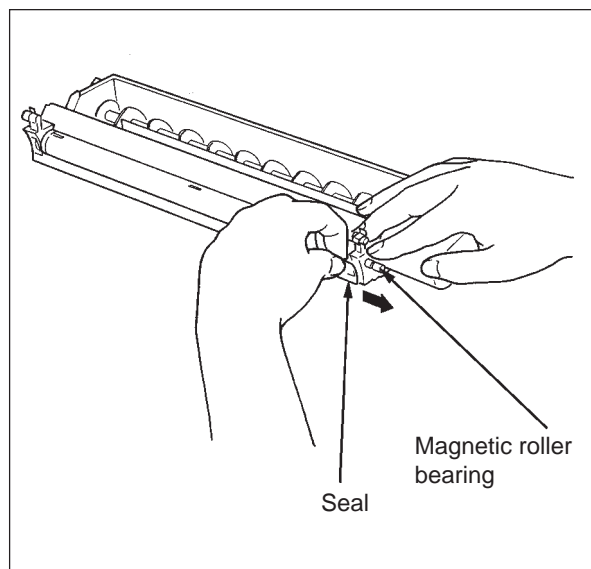


- (5) Remove the sleeve drive pulley, gear and belt.



- (6) Peel off the seal on the front and take out the magnetic roller bearing. After removing the magnetic roller from the frame slit, move the magnetic roller in the direction of the arrow and take it out toward you.

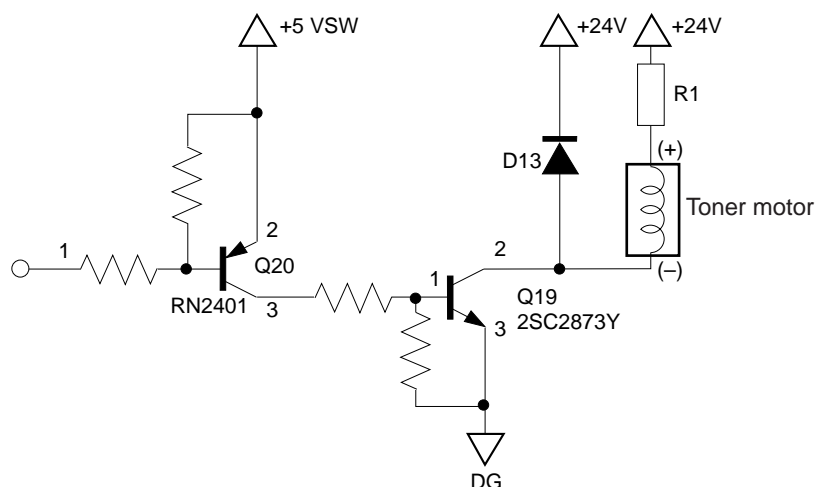
Note: After reassembly, the doctor-to-sleeve gap and the pole position should be adjusted.



10.4 Brush Motor Drive (M9)

The toner motor is provided to supply toner to the developer unit.

The toner motor is driven by 2SC2873Y (Logic PC board: Q19).



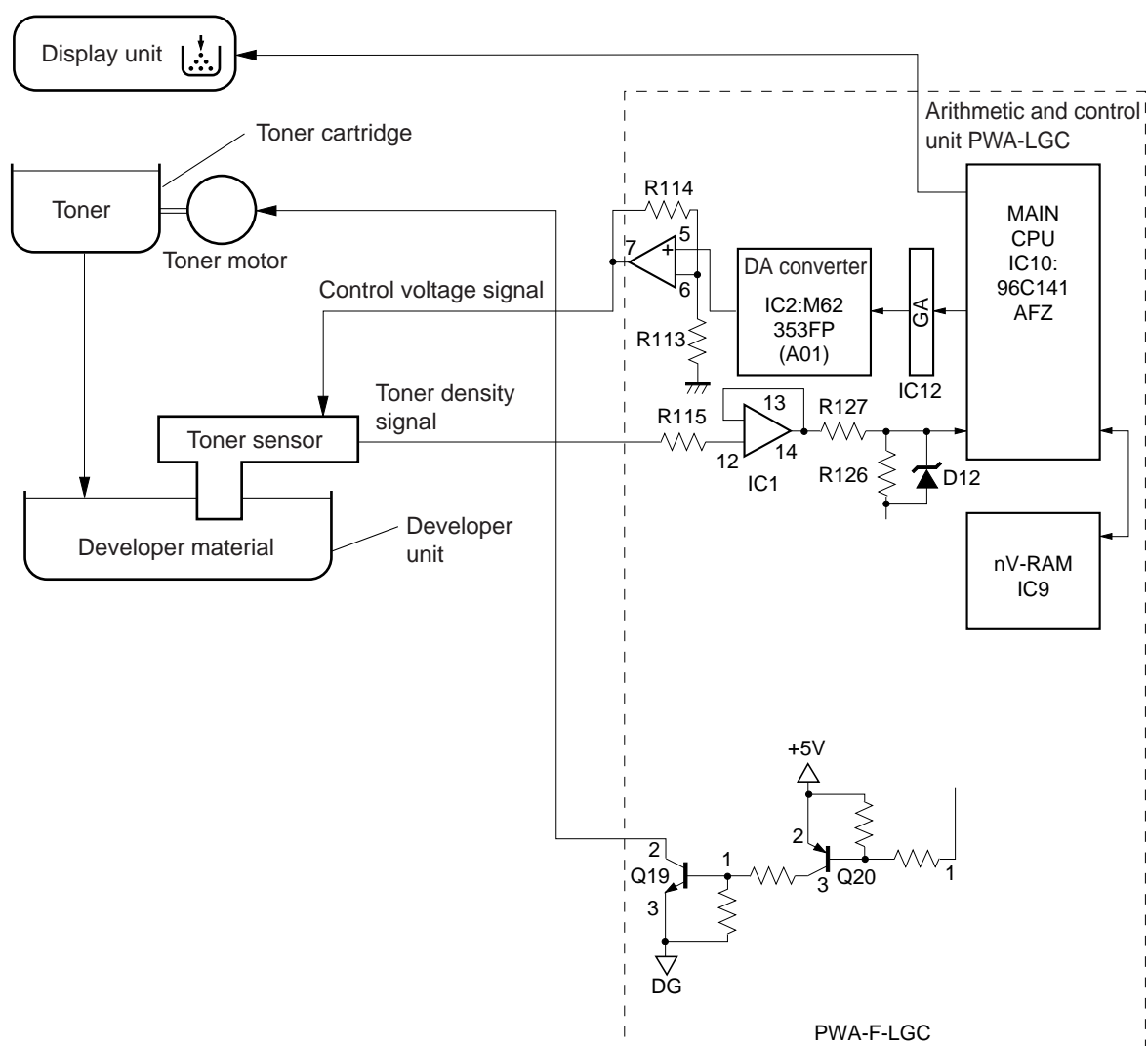
The (+) and (-) terminals of the motor winding is connected to +24V and pin 2 of Q19, respectively.

- When pin 1 of Q20 becomes "L", pin 2 of Q19 also becomes "L".
- A collector current flows from the +24V supply through the motor winding causing the motor to rotate.
- When pin 1 of Q20 becomes "H", pin 2 of Q19 also becomes "H", causing the current flowing through the motor winding to flow to the +24V supply through D13. → The current decreases with a time constant determined by the inductance and resistance of the winding → causing the motor to stop.

10.5 Auto-Toner Sensor Circuit

Brief description

- Functions of auto-toner circuit:
 - Detects density of toner in developer material.
 - ~ Density drops toner supply
 - Detects that toner in toner cartridge has been used up (toner empty).
- Configuration of auto-toner circuit
 - Auto-sensor: Detects toner density.
 - Control section: Control to maintain toner in developer at a constant specific density.
 - Toner motor: Replenishes the toner in the developer unit.
 - Display unit: Displays toner-empty status.



Operation of auto-toner sensor

(1) Functions of auto-toner sensor

Ⓐ Initialization adjustment function:

- When new settings are entered or when developer is replaced. –

Automatic or semi-automatic adjustment is made so that the output of the auto-toner sensor will be 2.3 – 2.5 V (input of IC8) against the toner density of the new developer material.

Ⓑ Toner density stabilization function:

- During copying operation –

- Toner consumption → toner density decreases → auto-toner sensor output changes are detected → toner motor is driven → toner is supplied to developer unit from toner cartridge.
~ The toner density is maintained at a constant level.

Ⓒ Toner-empty detection and release function:

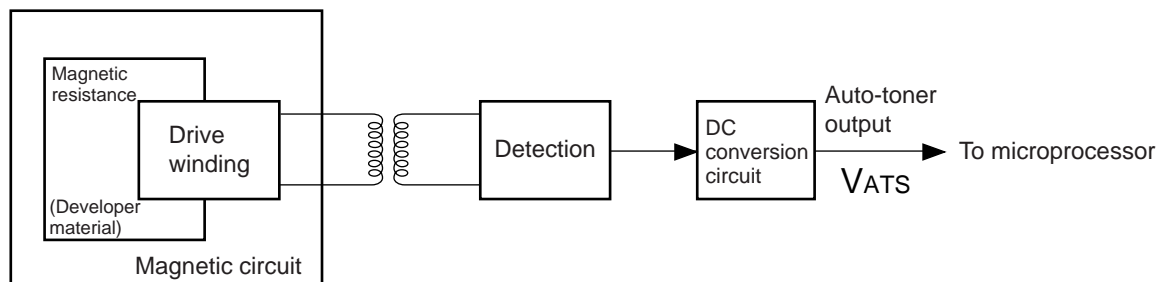
- Detects toner-empty state inside toner cartridge
 - ~ Drives toner motor → auto-toner sensor output is not changed → toner density does not change → judges that there is no toner (toner empty)
- Release of toner-empty state
 - ~ Toner cartridge replacement → drives toner motor → auto-toner sensor output changes → toner density returns to normal value → toner-empty state is released.

(2) Operation of auto-toner sensor

The auto-toner sensor is composed of the following circuits:

- Drive winding: Magnetic head which receives a high-frequency magnetic field (primary side). When placed in developer material, it forms magnetic circuit.
- Detection winding: Receives the changes in magnetic resistance of the developer material via a magnetic circuit (secondary side).
- DC conversion circuit: Converts the high-frequency output emitted from the detection winding to a DC signal.

↓
Auto-toner output VATS



– When the toner density is low –

 [The toner amount in the developer material is less than the required level in comparison with the iron powder (carrier).

 → Magnetic reluctance: Small → detection output: Large → Auto-toner output VATS: Large

– When the toner density is high –

 [The toner amount in the developer material is more than the required level in comparison with the iron powder (carrier).

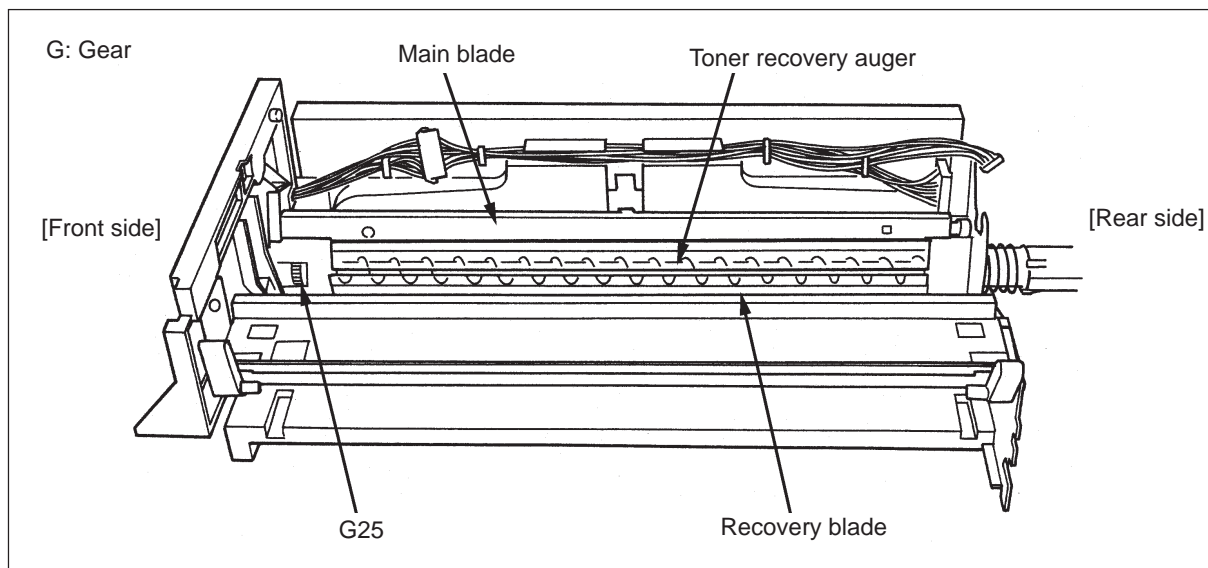
 → Magnetic reluctance: Large → detection output: Small → auto-toner output V: Small

- DC voltage corresponding to toner density in the developer material = auto-toner output VATS.

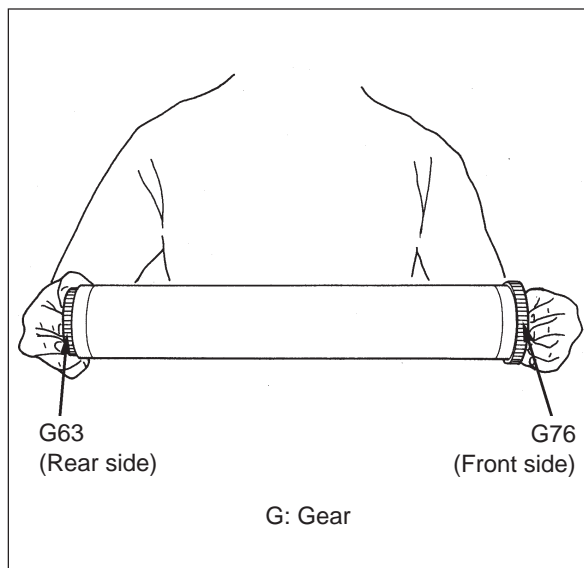
11. CLEANER UNIT (Shares Part of the Process Unit)

11.1 Construction

The cleaner unit consists of the main blade, recovery blade, toner recovery auger, toner bag, etc. (For the main charger, LED erasing array, discharge lamp, etc., refer to Chapter 9.)



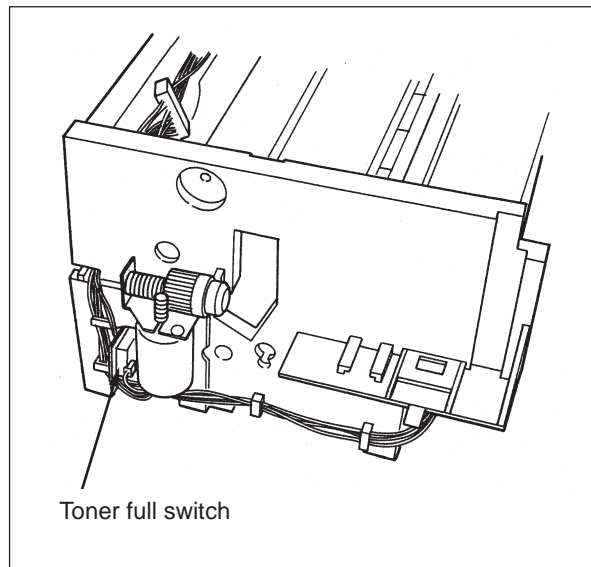
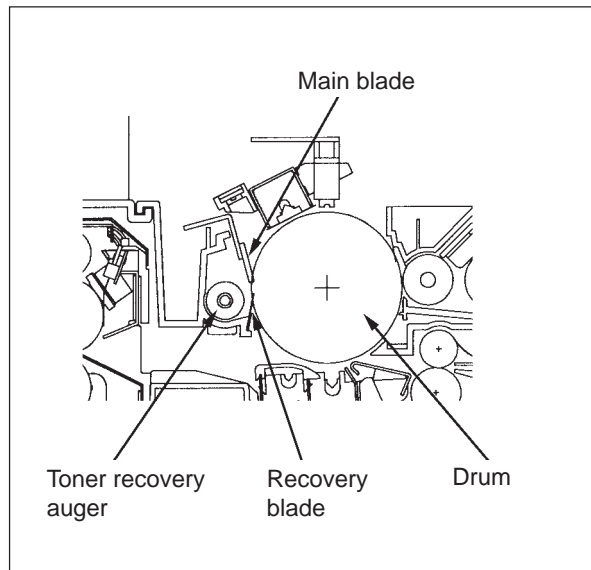
View with the drum, main charger unit and developer unit removed



View with the drum removed

11.2 Explanation of Functions

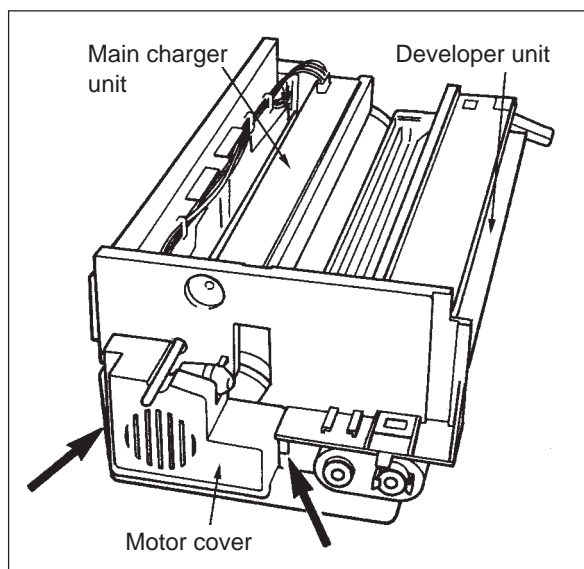
- Main blade
Scrapes the drum surface to remove the residual toner. The main blade is pressed on the drum with a fixed pressure by the pressure spring.
- Recovery blade
Collects the toner scraped off by the main blade.
- Toner recovery auger
Transports the toner scraped off to the toner bag on the rear side.
- Toner full switch
When the toner bag becomes full of recovered toner, the toner recovery auger is forced to the front, causing the toner full switch (S10) to be turned on.



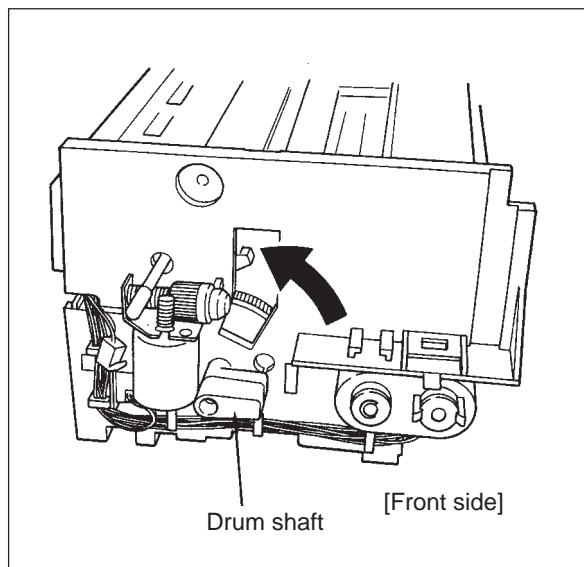
11.3 Disassembly and Replacement

11.3.1 Cleaner unit

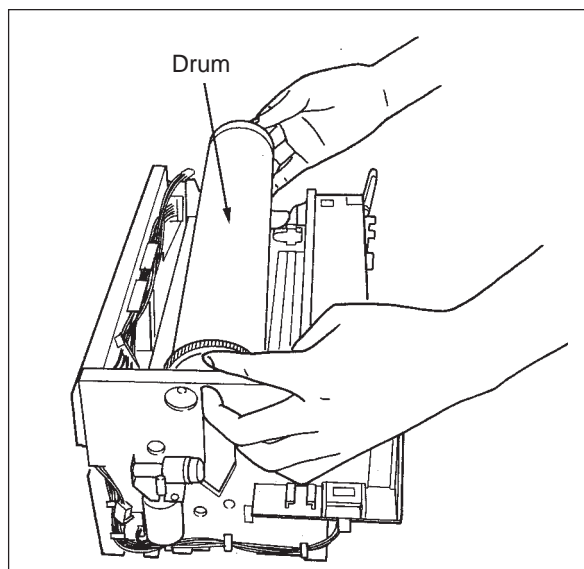
- (1) Remove the process unit. Refer to para. 9.3.1.
- (2) Remove the drum (when it is to be replaced).
 - Remove the developer unit.
 - Remove the main charger unit.
 - Disengage the two claws to remove the motor cover.



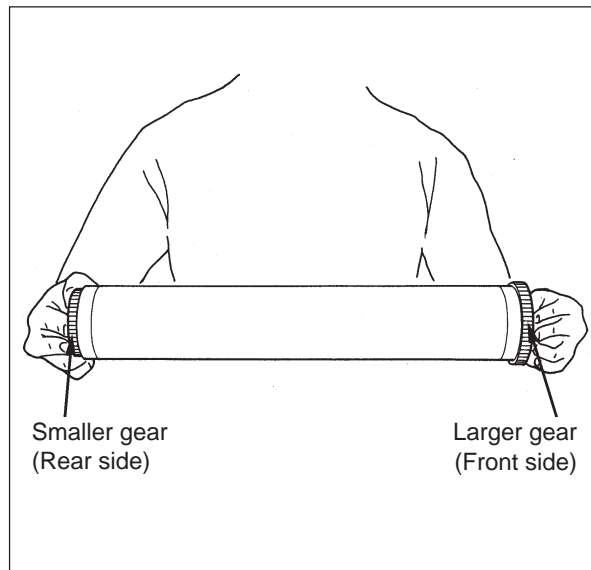
- Unlock the drum shaft lock (by rotating it in the direction of the arrow) and then pull the shaft out from the front.



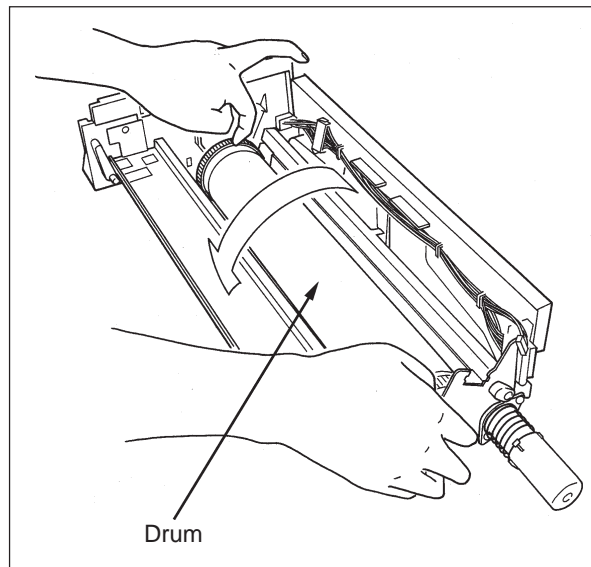
- When removing the drum, place your hands on the sides of the drum, as shown in the figure on the right and take it out carefully.



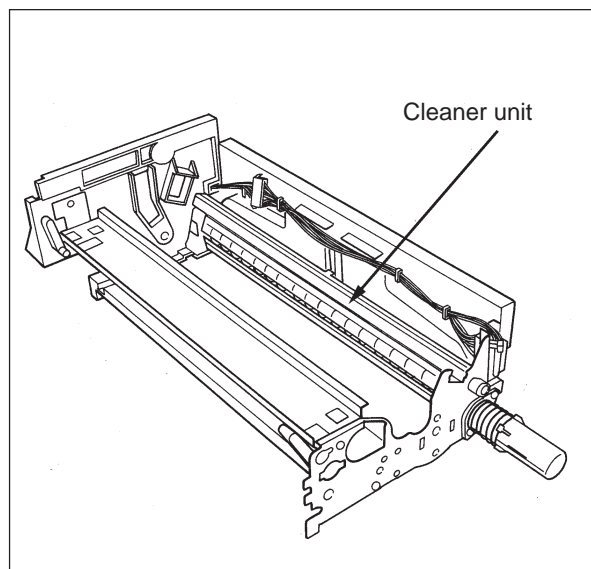
Notes: 1. When setting the drum in the process unit, its smaller drive gear should be on the rear side.



2. After inserting the drum shaft, apply patting powder on the entire surface of the drum and rotate the drum toward you.

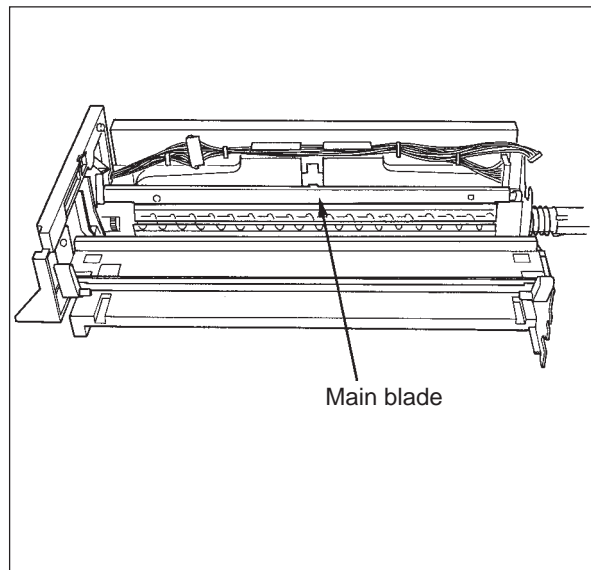


The figure on the right shows the cleaner unit after the developer unit, main charger unit and drum are removed from the process unit.

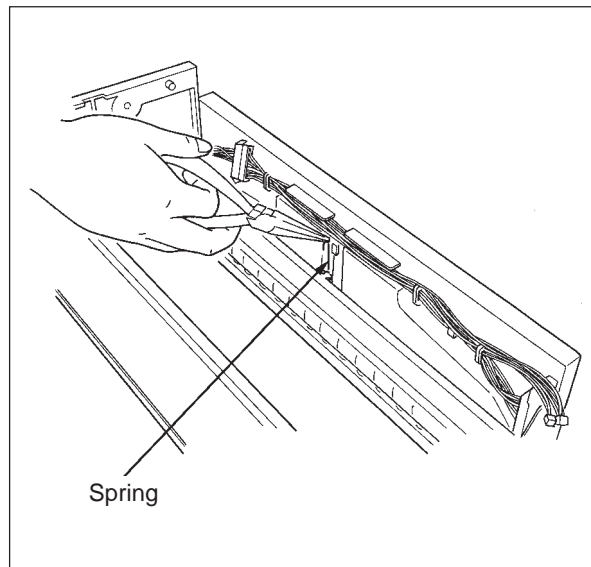


11.3.2 Main blade

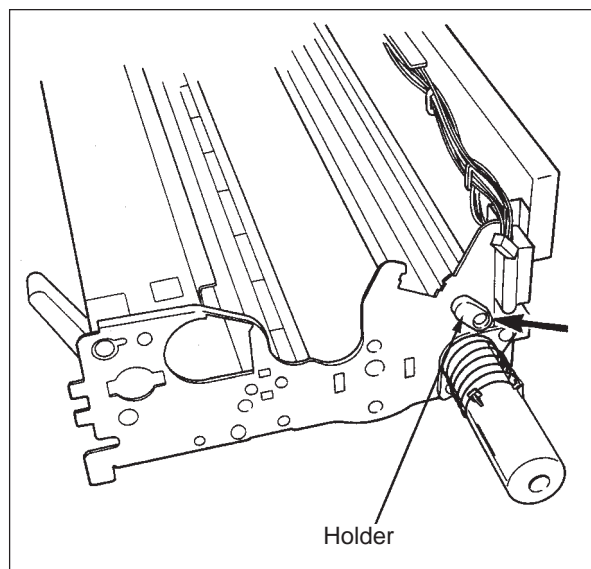
- (1) Remove the developer unit, main charger unit and drum.



- (2) Remove the spring.

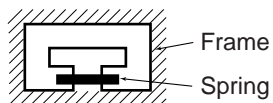


- (3) Remove the holder on the rear (1 screw).
(4) Remove the blade.

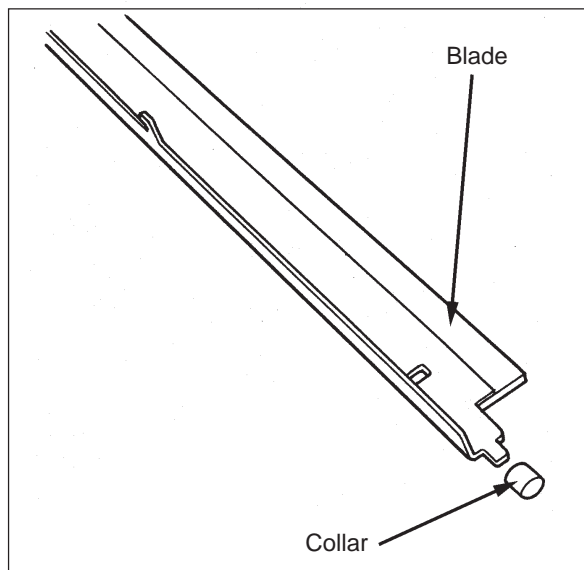


- (5) Remove the collar on each side of the blade and install them to the new blade.

Notes: 1. During reassembly, attach the spring securely. (Make sure that the frame side should look as shown below.)

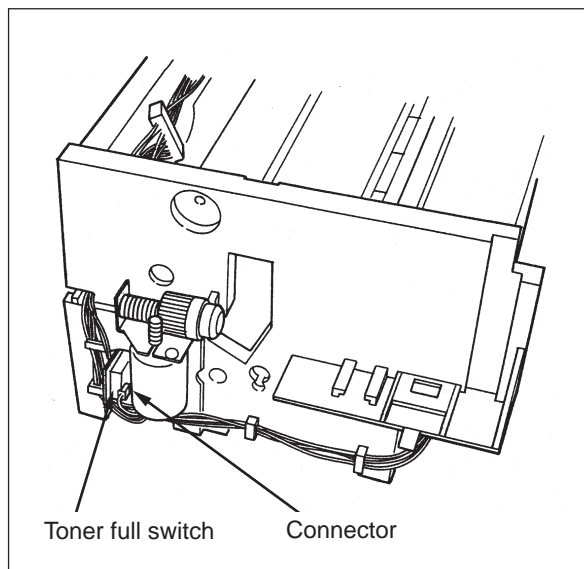


2. After installing the drum, apply patting power to the drum and rotate it. Refer to Sec. 11.3.1.



11.3.3 Toner full switch

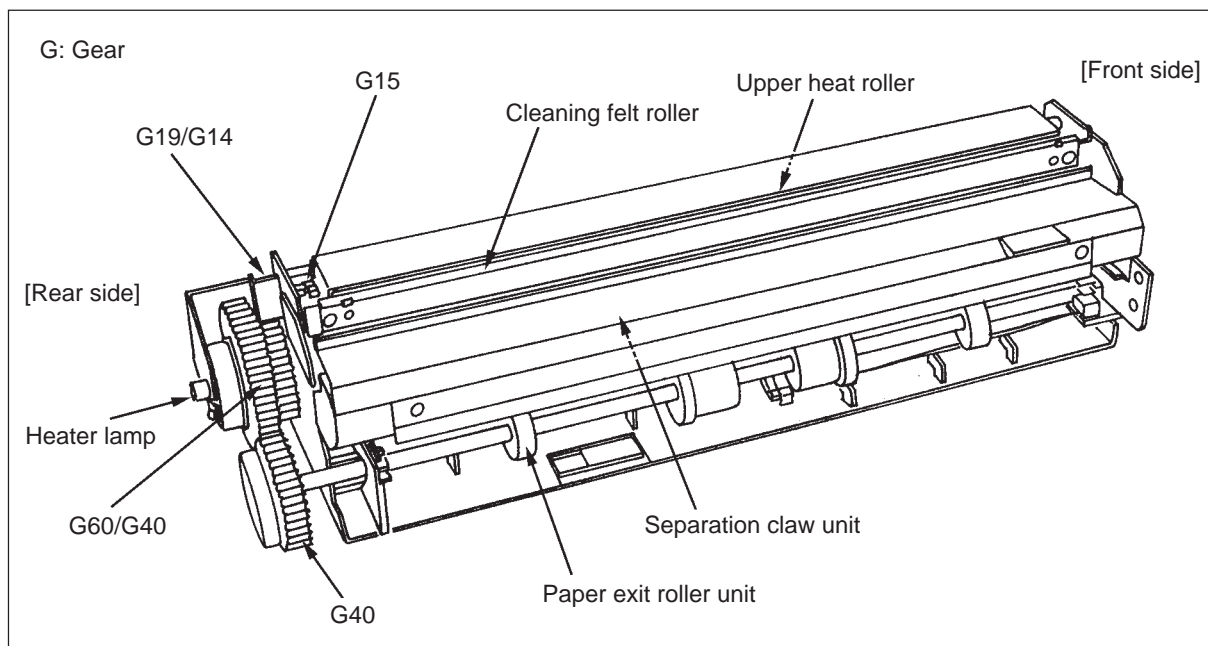
- (1) Disconnect a connector.
- (2) Remove the switch.



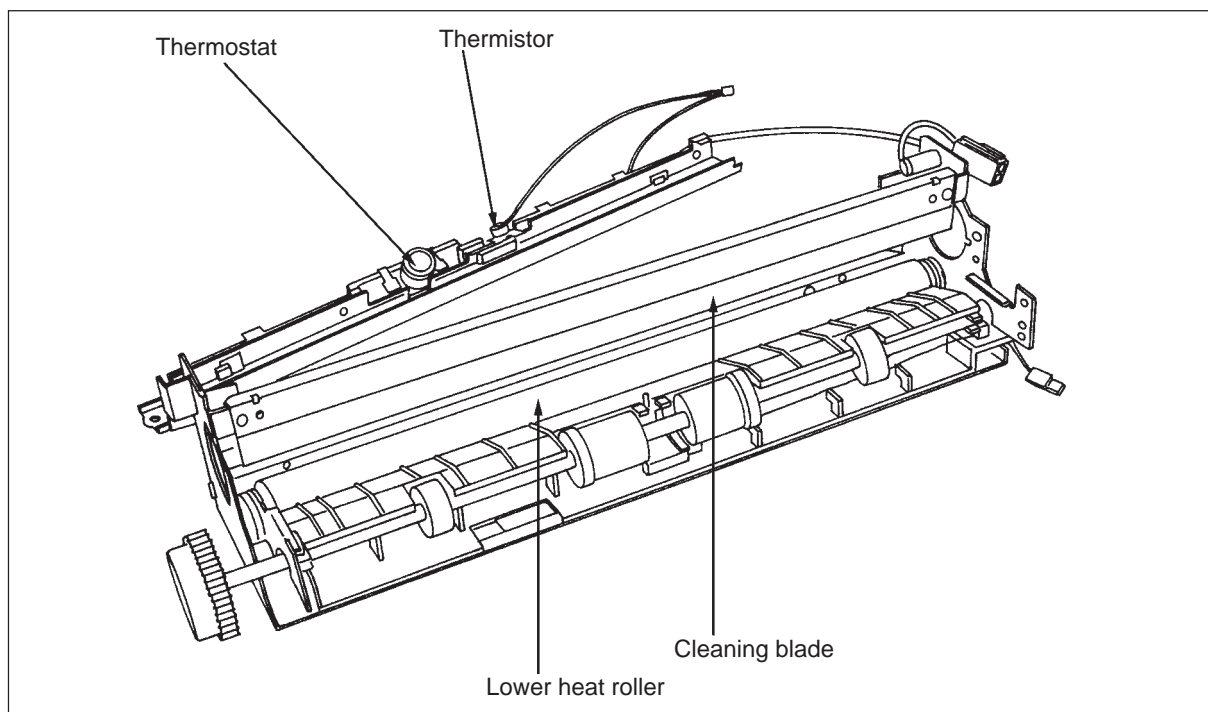
12. FUSER AND PAPER EXIT SECTION

12.1 Construction

This section consists of the upper heat roller, cleaning felt roller, paper-exit roller unit, separation claw unit, thermistor, thermostat, lower heat roller, cleaning blade, heater lamp, etc.

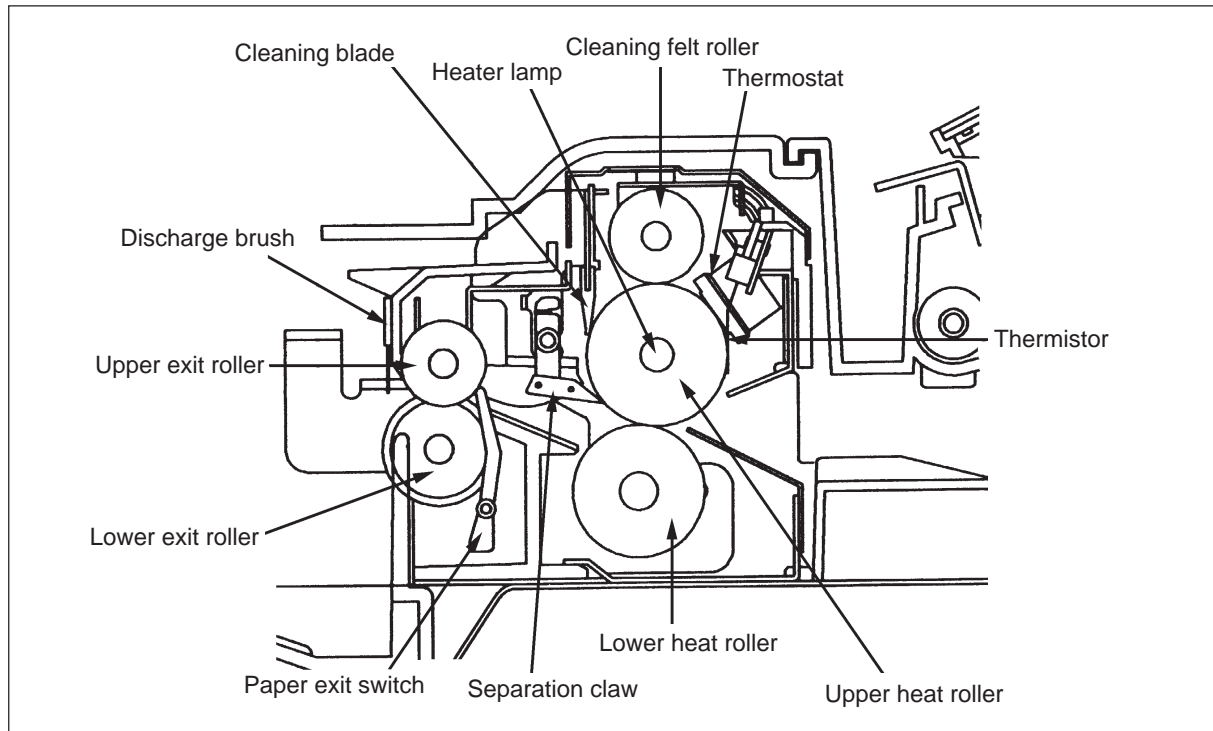


View with the fuser guard removed



View with the upper heat roller removed

12.2 Explanation of Operation



A. Fuser unit

This unit applies heat and pressure to the copy paper separated and transported from the drum to fix the toner image to the paper. The upper and lower rollers are rotated under a fixed pressure (provided by spring force) by the drive from the main motor. The upper roller has a heater lamp inside it and is rotated by the drive from the main motor but the heater lamp does not rotate.

Both the upper and lower rollers are always pressed against each other by spring force while the upper unit is closed. But when the upper unit is raised, they are released from the pressure.

The copy paper which has finished being fixed is separated smoothly from the upper heat roller with the aid of the separation claws. The temperature detection section functions to control the temperature of the upper roller (by means of a thermistor) and when it detects an abnormally high temperature, the power supply to the heater lamp is shut off (by means of a thermostat).

B. Paper exit section

The upper and lower exit rollers are rotated through gears by the drive from the fuser unit. The copy paper which has finished the fixing process is smoothly exited onto the copy tray through the upper and lower exit rollers.

The paper exit switch functions to detect whether or not the copy paper is properly exited onto the copy tray.

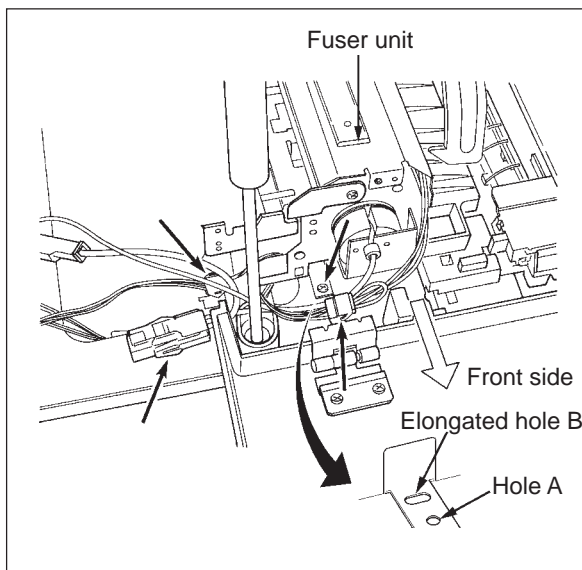
12.3 Disassembly and Replacement

12.3.1 Fuser unit

- (1) Remove the left side cover (lower) (2 screws).
- (2) Remove the inner cover (lower left) (1 screw).
- (3) Remove one screw and disconnect three connectors.
- (4) Pull out the fuser unit toward the front.

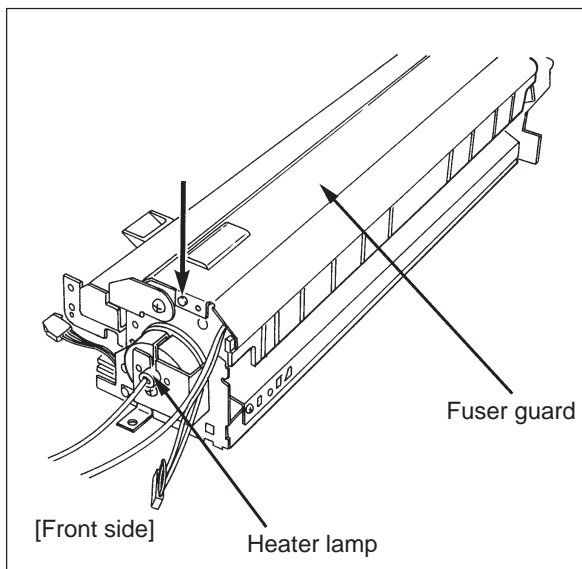
Note: The screw holding the fuser unit is tightened at the hole A at the time of shipping from the factory.

However, when tilting the fuser unit in order to correct the inclination of the straight image, retighten the screw at the elongated hole B.

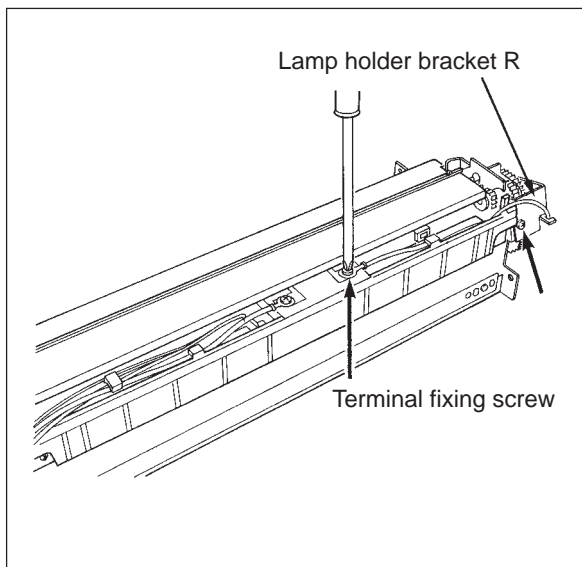


12.3.2 Heater lamp

- (1) Remove the fuser unit.
- (2) Remove the fuser guard (1 screw).

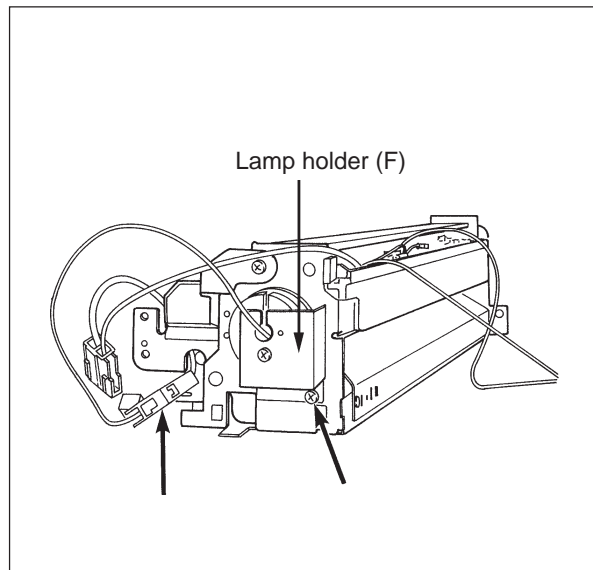


- (3) Remove the screw fastening the terminal on the rear.
- (4) Remove the lamp holder bracket (R) (1 screw).



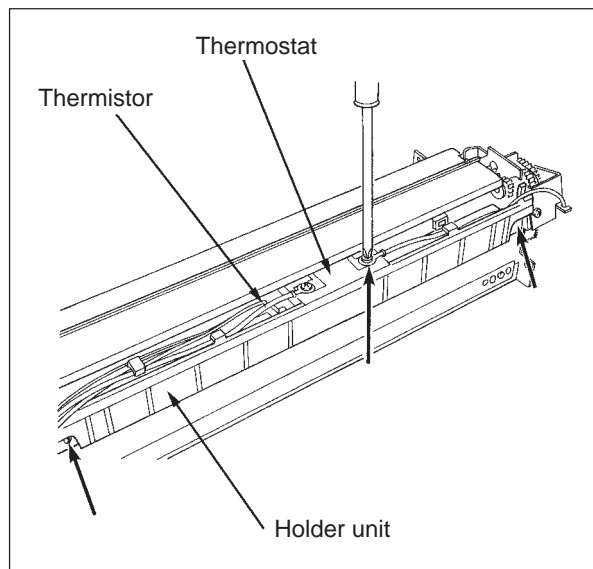
- (5) Disconnect one connector and remove one screw to take out the lamp holder (F).

Notes: 1. When replacing the lamp, don't touch it with a bare hand.
2. Be careful so that the Toshiba mark is on the front side.



12.3.3 Thermostat, thermistor and brush

- (1) Remove the fuser unit.
- (2) Remove the fuser guard.
- (3) Remove the rear screw of the thermostat.
- (4) Remove the holder unit (2 screws).



Thermostat:

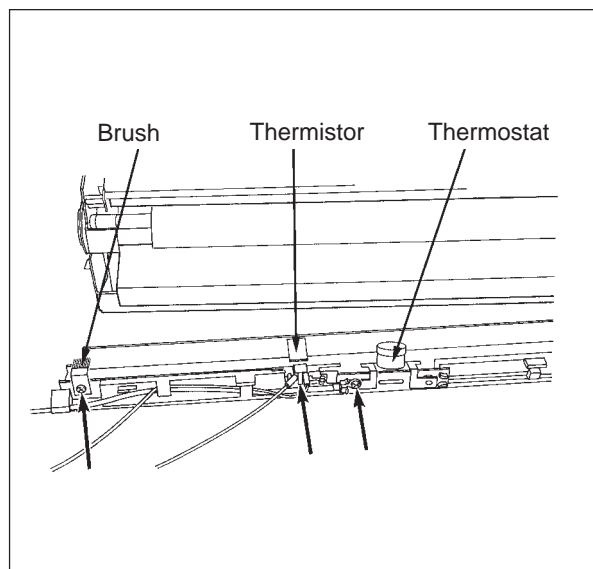
- Remove one screw to take it out.

Thermistor:

- Remove one screw to take it out.

Brush:

- Remove one screw to take it out.



12.3.4 Cleaning felt roller and cleaning blade

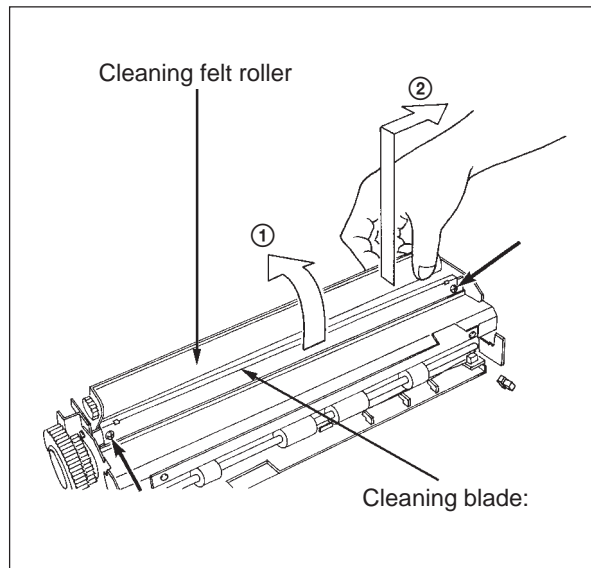
- (1) Remove the fuser unit.
- (2) Remove the fuser guard.

Cleaning felt roller:

- Lifting the front side, take out the whole roller unit upward (①→②).

Cleaning blade:

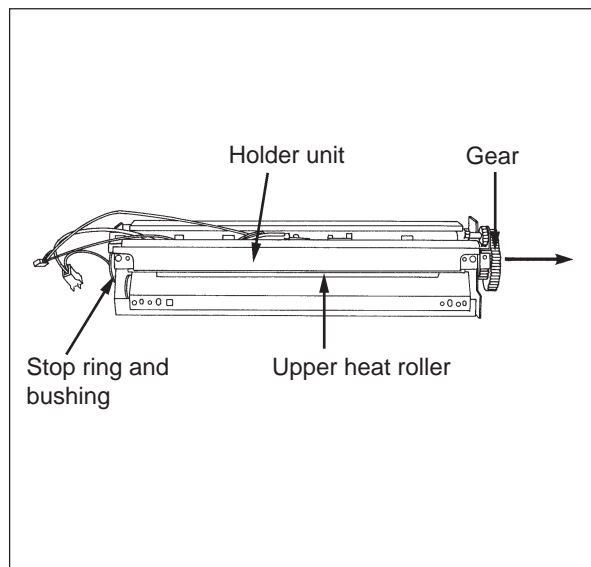
- Remove two screws to take out the roller.



12.3.5 Upper heat roller

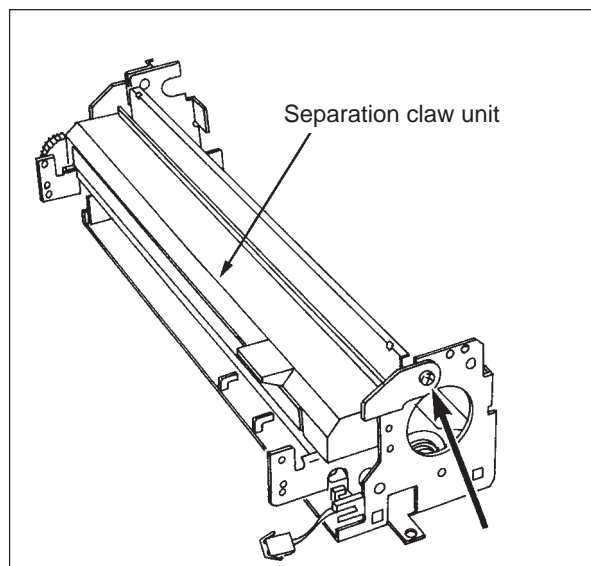
- (1) Take out the heater lamp.
- (2) Remove the holder unit (2 screws).
- (3) Remove the stop ring and bushing on the front and then pull out the roller along with its gear toward the rear.

Note: While replacing the roller, be careful not to damage the roller surface with metal-plate edges or be careful not to deform or damage the separation claws.

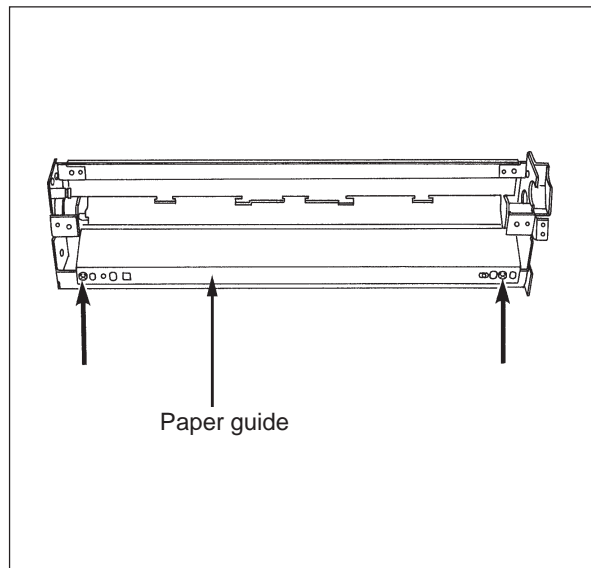


12.3.6 Lower heat roller

- (1) Remove the upper heat roller.
- (2) Remove the separation-claw unit (1 screw).

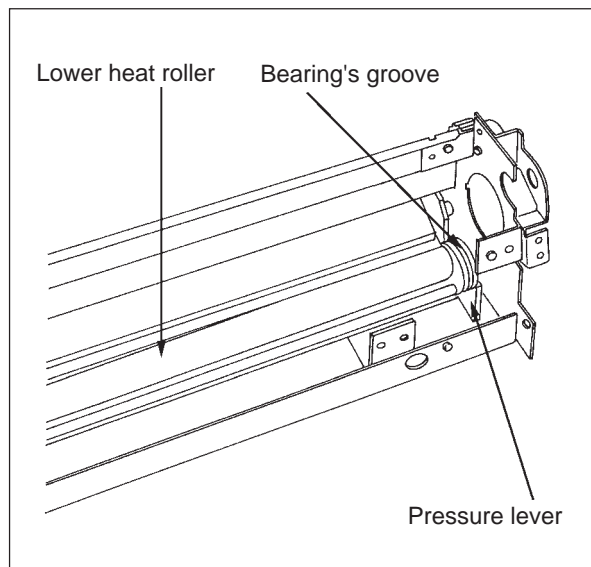


(3) Remove the paper guide (2 screws).



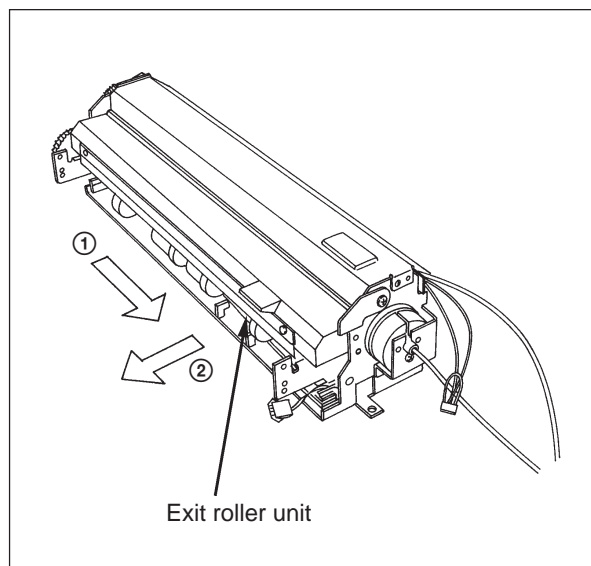
(4) Placing your finger tip on each side of the roller, take out the roller along with the bearings upward.

Note: After setting the lower heat roller in the machine, check to make sure that the pressure levers are fitted in the bearing grooves (at the front and rear).



12.3.7 Lower exit roller and paper exit switch

- (1) Take out the fuser unit.
- (2) Slide the exit roller unit to the front and then take it out toward you (①→②).

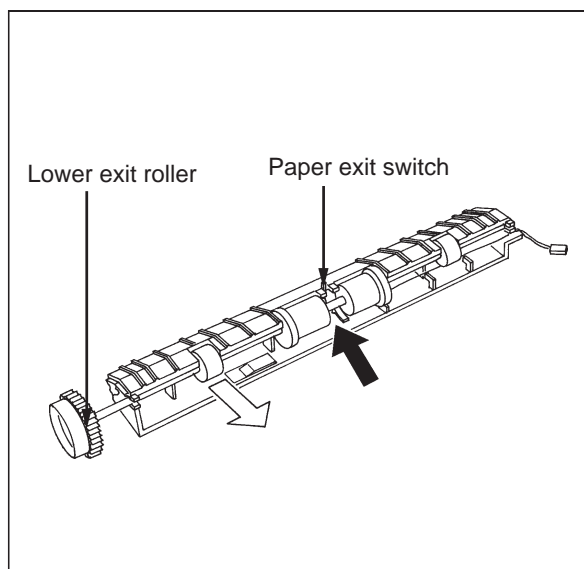


Lower exit roller:

- Take it out in the direction of the arrow.

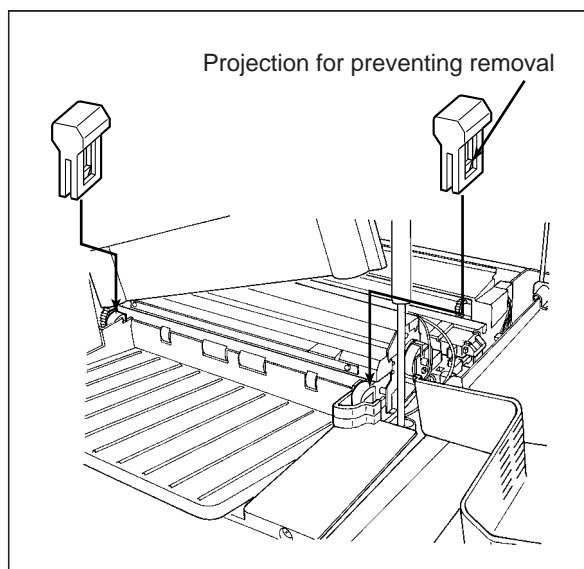
Paper exit switch:

- Remove one screw.



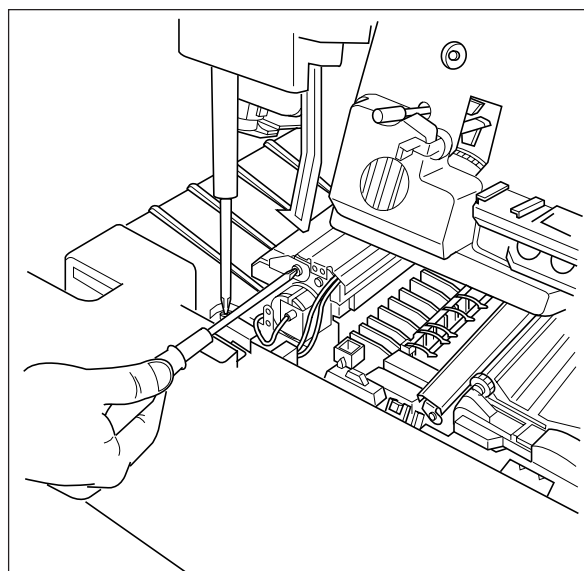
12.3.8 Lever caps

When installing the lever caps, pay attention to their orientations: The projection for preventing removal of each lever cap should face front side.

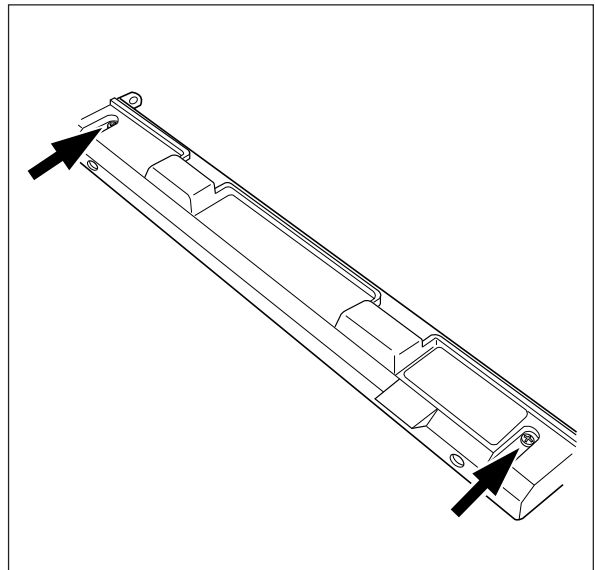


12.3.9 Separation claws (6)

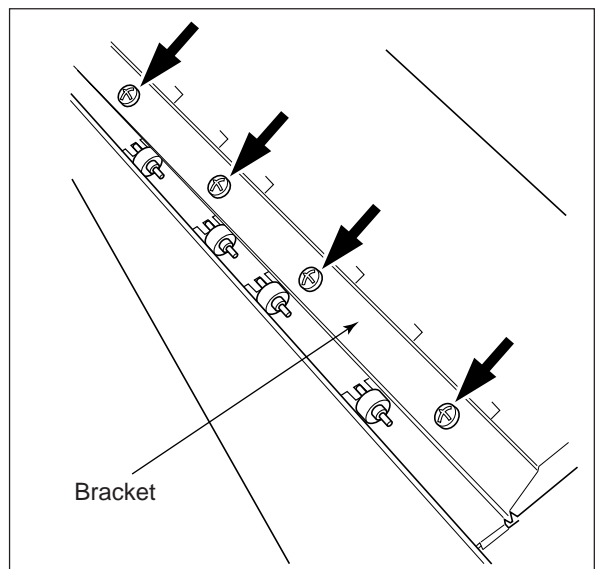
- (1) Remove the inner cover (lower left) (1 screw).
- (2) Remove the separation claw unit (1 screw).



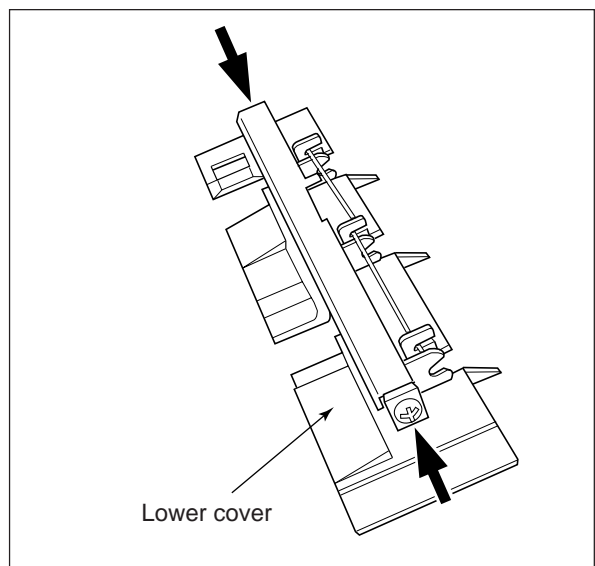
- (3) Remove the upper cover of the separation claw unit (2 screws).



- (4) Remove the bracket from the separation claw unit (4 screws).



- (5) Remove the lower cover (4 screws). (1 unit : screws 2×2) Take off the six claws from the claw holder.



12.4 Heater Control Circuit

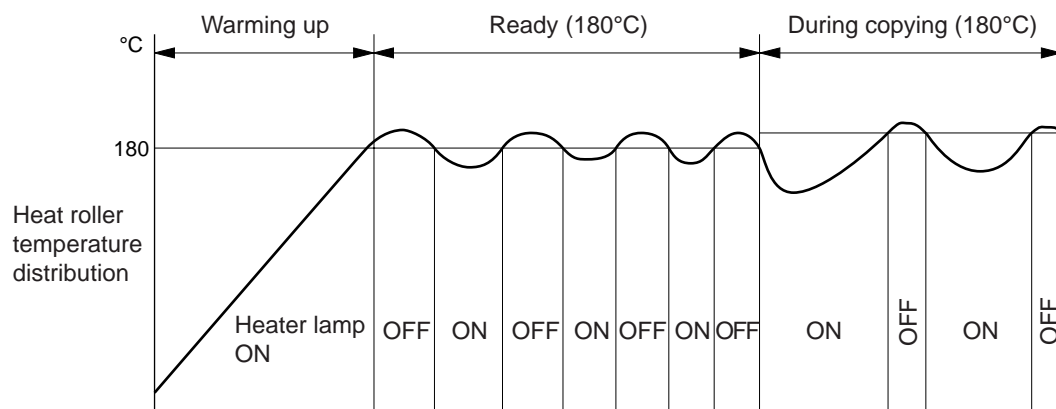
(1) Temperature detection unit

In order to control the temperature of the heat roller, the temperature detector unit detects the heat-roller temperature with a thermistor and ON/OFF controls the heater lamp. Heat roller surface temperature 180°C (thermistor resistance value: 7.4 K Ω approx.)

Reference

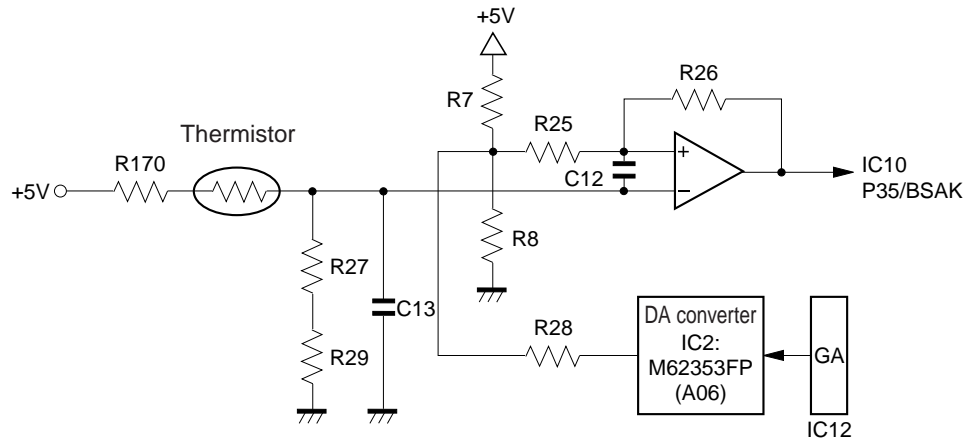
Relationship between heat roller surface temperature and thermistor resistance value.

Temperature	Thermistor resistance	Heater lamp state
Less than 180°C	More than 7.4 K Ω	ON
180°C	7.4K Ω	Maintains previous state
More than 180°C	Less than 7.4 K Ω	OFF



(2) Thermistor disconnection detection

- Resistance value of thermistor changes→Input voltage changes
- Input voltage can be obtained by dividing the pressure of R170, thermistor, R27 and R29.
- The main CPU detects the changes and judges whether the thermistor is normal or not.

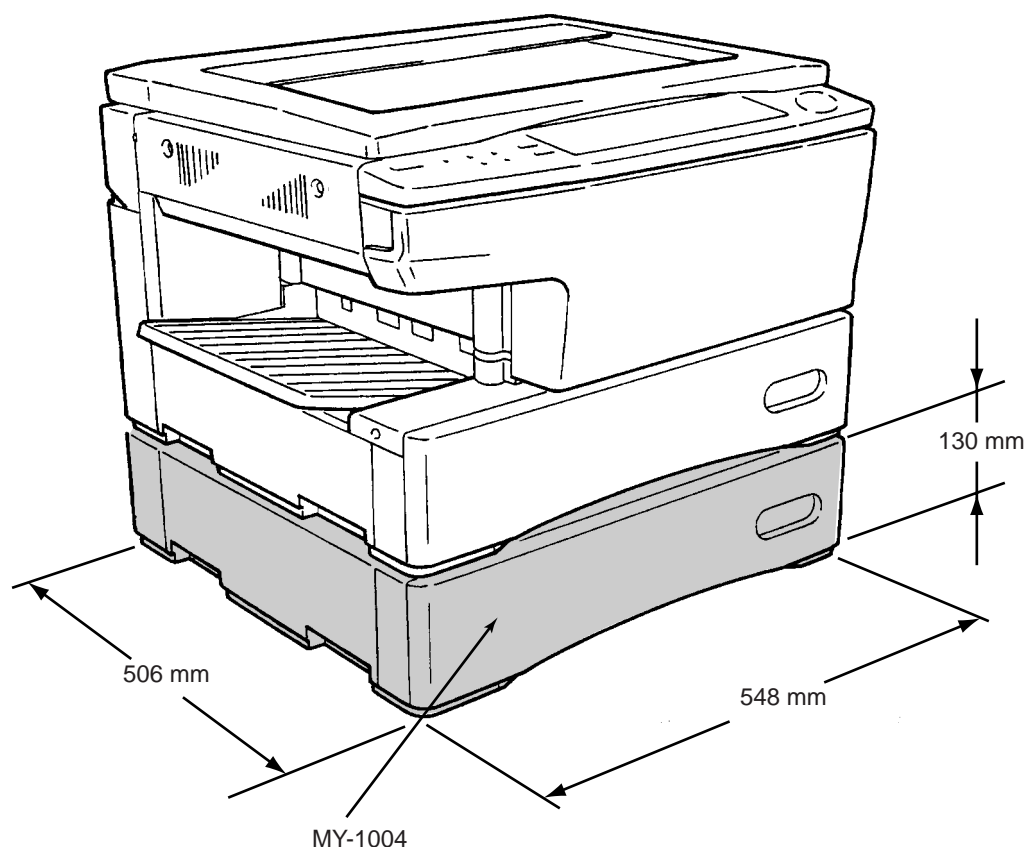


13. OPTIONAL PAPER FEEDING UNIT (MY-1004)

13.1 Specifications

Model Name	Paper feeding unit (PFU) MY-1004
Number of Cassette	One
Cassette Capacity	500 sheets (50mm or less)
Paper Size	A3 – A5-R Ledger – Statement-R
Paper Weight	64 – 80 g/m ² 17 – 22 lbs.
Dimensions	W 548 x D 506 x H 130 mm W 21.6" x D 19.9" x H 5.1"
Weight	8 kg 18 lbs.
Power Source	Supplied from the copier
Factory-Set Size	A3 for Europe (User adjustable) Ledger for USA/Canada (Serviceman adjustable)

Note: Specifications are subject to change without notice.

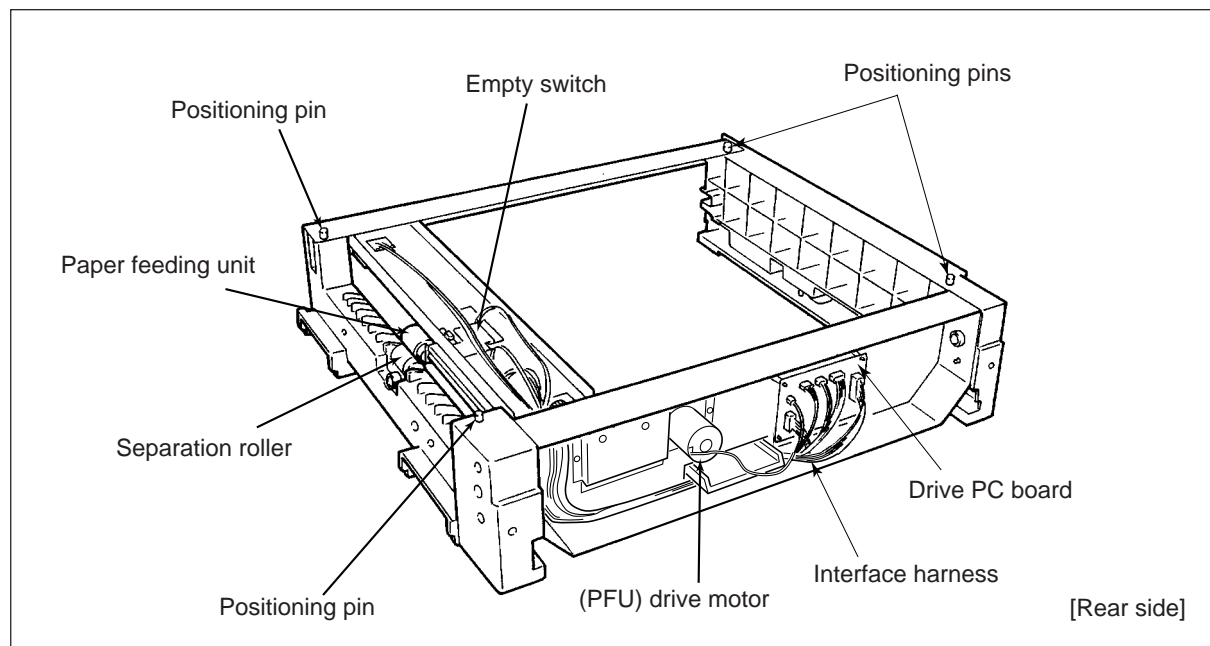


13.2 General Description

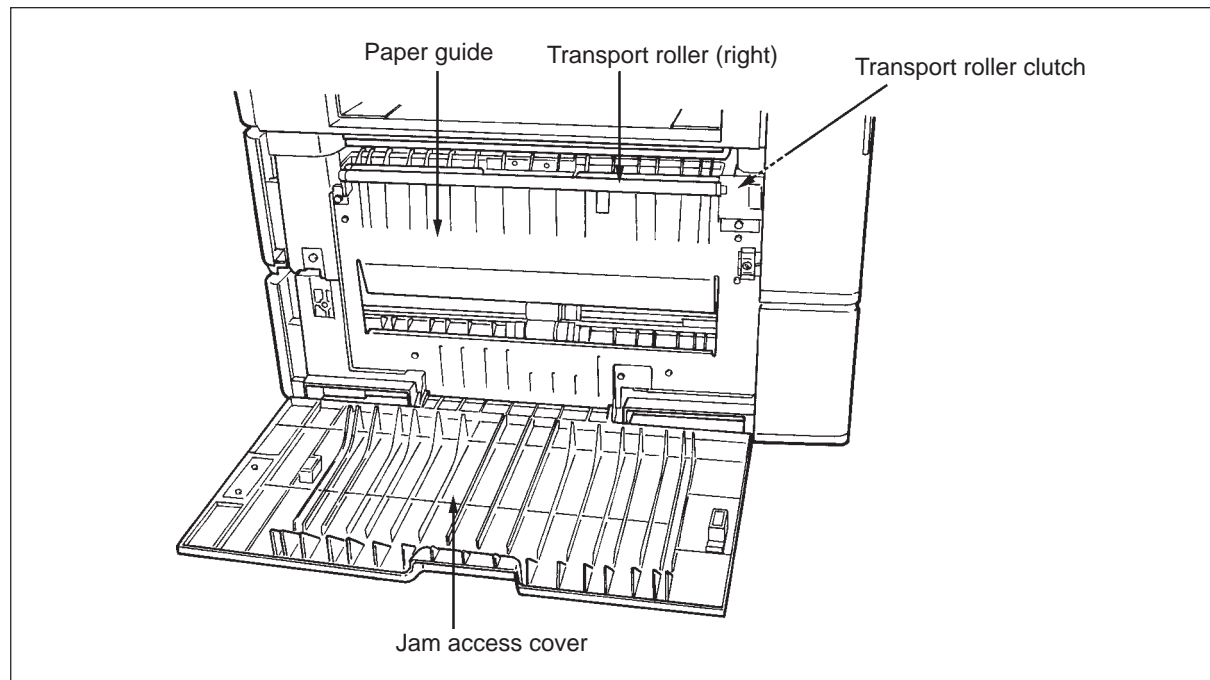
13.2.1 Front sectional view Refer to P2-1.

13.2.2 Rear side view Refer to P2-2.

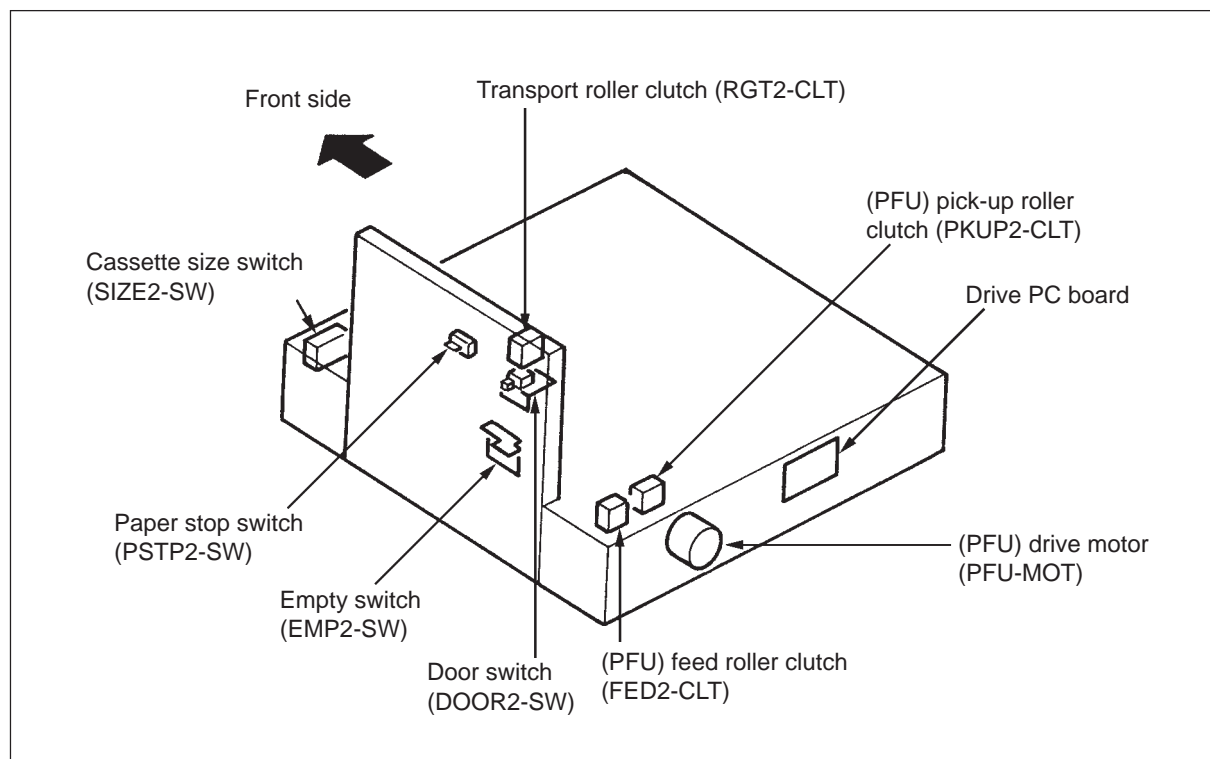
13.2.3 Names of the main components



View with the rear cover and cassette removed



13.2.4 Electrical parts location diagram



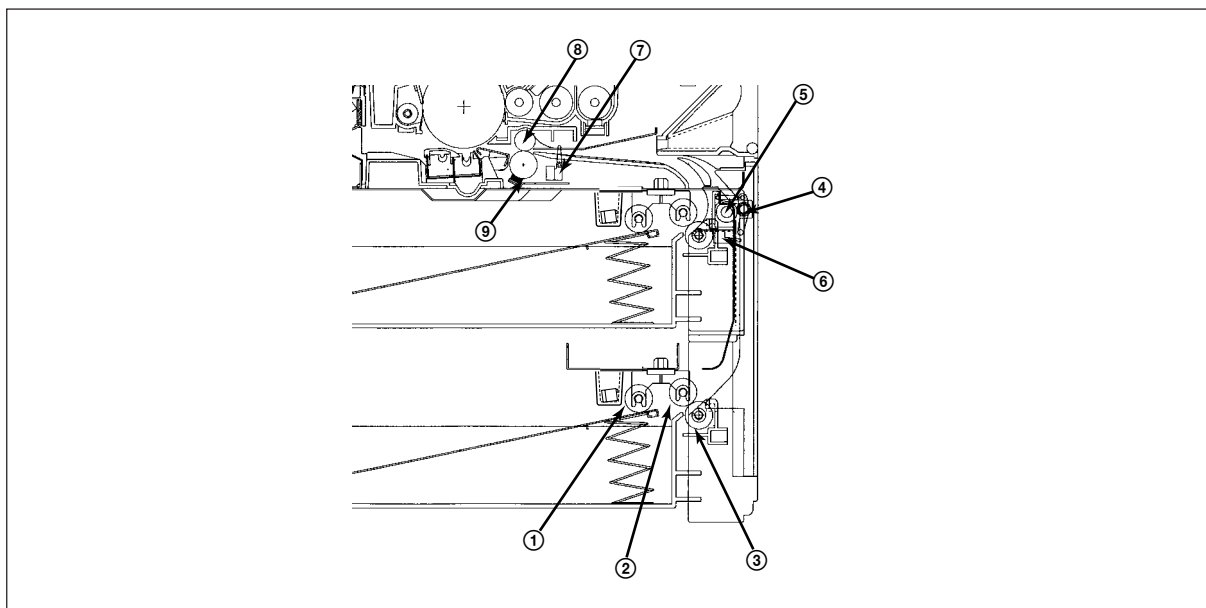
13.2.5 Symbols and functions of electrical parts

*Refer to SERVICE PARTS LIST MY-1004

Symbol	Name	Function	Remarks	*Page/item No.
(M10)	PFU-MOT (Drive motor)	Drives the pick-up and feed rollers.	—	P2, I18
(CLT4)	RGT2-CLT (Transport roller clutch)	Controls the rotation of the transport roller.	—	P3, I5
(CLT6)	PKUP2-CLT (Pick-up roller clutch)	Controls the rotation of the pick-up roller.	—	P2, I4
(CLT5)	FED2-CLT (Feed roller clutch)	Controls the rotation of feed roller.	—	P2, I4
(S15)	PSTP2-SW (Paper stop switch)	Detects the paper fed from the cassette. It also detects when the feed clutch is turned OFF.		P3, I7
(S16)	EMP2-SW (Empty switch)	Detects when the cassette runs out of paper.	Reflective-type photosensor	P2, I16
(S17)	DOOR2-SW (Door switch)	Detects whether or not the cover is open.		P3, I13
(S18)	SIZE2-SW (Cassette size switch)	Detects the cassette size or whether the cassette is installed or removed.		P2, I30

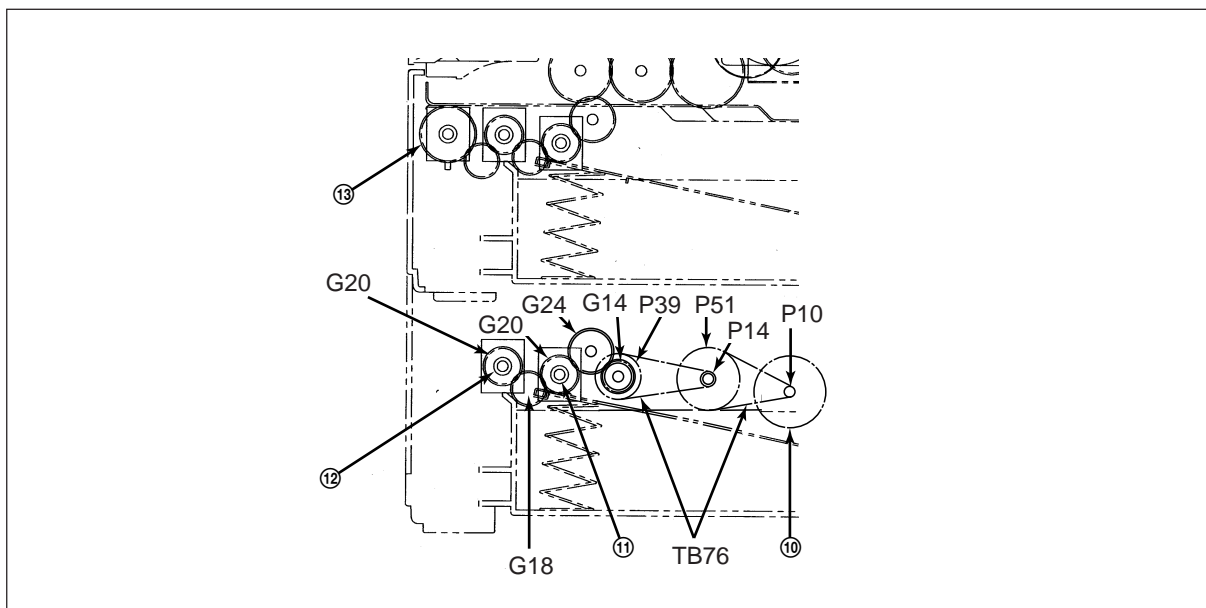
13.3 Functions and Operation

13.3.1 Paper feeding operation



View as seen from the front

- | | | | |
|---------------------------|---------------------|---------------------|----------------------------|
| ① Pick-up roller | ② Paper feed roller | ③ Separation roller | ④ Transport roller (right) |
| ⑤ Transport roller (left) | ⑥ Paper stop switch | ⑦ Aligning switch | ⑧ Aligning roller (upper) |
| ⑨ Aligning roller (lower) | | | |



View as seen from the rear

- | | | | |
|---------------|-------------------------|----------------------|---------------------------|
| ⑩ Drive motor | ⑪ Pick-up roller clutch | ⑫ Feed roller clutch | ⑬ Transport roller clutch |
|---------------|-------------------------|----------------------|---------------------------|

When the **PRINT** key is pressed, sheets of paper start being fed from the paper feeding unit (PFU) in the sequence described below:

- (1) About 0.1 sec. later, the drive motor (M10) ⑩ is energized, causing the pick-up roller ① and paper feed roller ② to rotate. The pick-up roller is rotated through the pick-up roller clutch (CLT6) ⑪. The paper feed roller is rotated through the feed roller clutch (CLT5) ⑫ and the transport rollers are rotated through the transport roller clutch (CLT4) ⑬.
(The transport rollers are driven by copier's main motor).
- (2) The top sheet of paper in the cassette is fed out by the pick-up roller to the paper feed roller which separates the top sheet from other sheets if more than one sheet has been fed out and sends only the top sheet to the transport roller. When this sheet turns on the paper stop switch ⑥ located under the transport roller, the feed roller clutch ⑫, pick-up roller clutch ⑪ and drive motor are deenergized, causing the pick-up and paper feed rollers to stop.
- (3) At this time, if the copier's aligning switch ⑦ is off, the transport roller clutch maintains an on-status until this switch is turned on. But if the copier's aligning switch is on, the transport roller clutch is deenergized, causing the rollers to stop.
- (4) When the copier's aligning roller is turned off, transport roller clutch is turned on, the rollers start rotating again. At this time, since the feed roller clutch ⑫ is off, only the transport roller is rotated, sending the sheet fed from the cassette into the copier.
- (5) After the sheet turns on the copier's aligning switch and is aligned by the copier's aligning rollers ⑧ and ⑨, the transport roller clutch is deenergized, causing the rollers to stop.
- (6) After the first sheet's trailing edge has passed the paper stop switch ⑥ to turn it off, when the paper feeding unit (PFU) receives the next paper feed signal from the copier, the above sequence of operation will be repeated.

13.3.2 Detection and clearing of paper jams

- (1) Within 1.238 sec. after a sheet of paper is fed, if its leading edge does not arrive at the paper stop switch ⑥, the jam detection device of the paper feeding unit (PFU) activates to turn off the drive motor ⑩, pick-up roller clutch ⑪ and feed roller clutch ⑫.

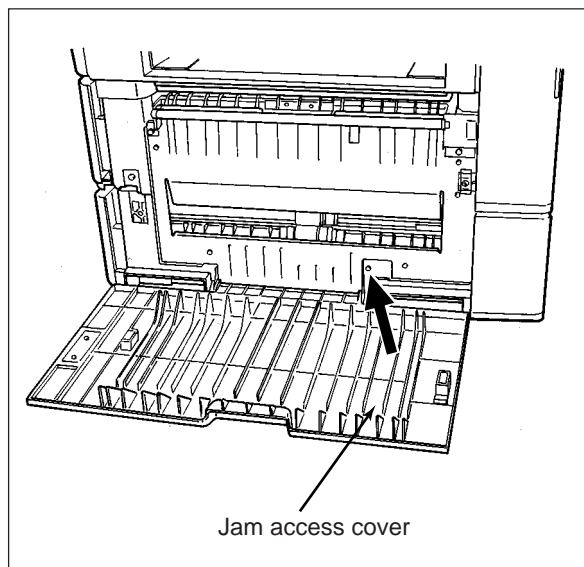
- (2) To clear the paper jam condition, you open the cover of the paper feeding unit (PFU), remove the jammed paper and close the cover. At this time, if the paper stop switch ⑥ continues to be turned on, PFU decides that paper still remains in it and does not clear the paper jam status.
- (3) During multicopying from the paper feeding unit (PFU), if a paper jam occurs inside the PFU, all the sheets of paper fed before the jammed sheet will be processed normally.

13.4 Disassembly and Replacement

13.4.1 Covers and paper guide

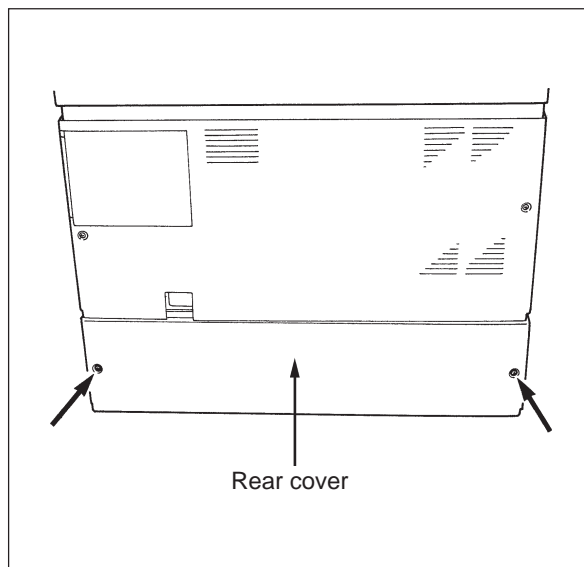
[A] Jam access cover

- (1) Open the jam access cover.
- (2) Loosen the screw and take out the cover.



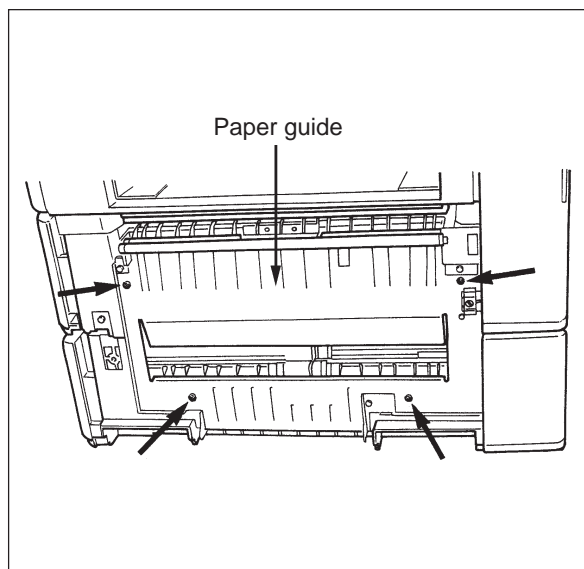
[B] Rear cover

- (1) Remove two screws to take out the cover.

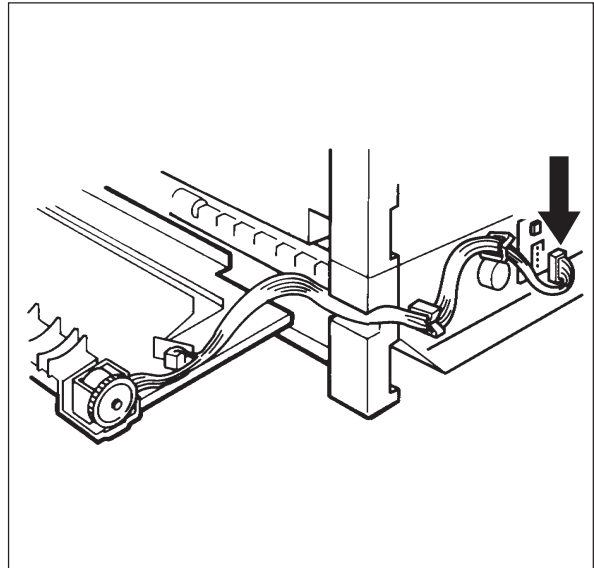


[C] Paper guide

- (1) Remove the jam access cover.
- (2) Remove four screws.

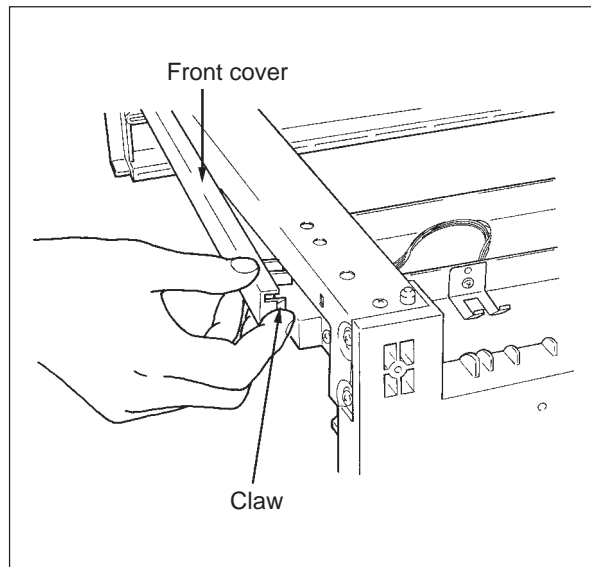


- (3) Disconnect one connector to take out the guide.



[D] Front cover

- (1) Remove the cassettes of both the copier and the paper feeding unit.
- (2) Unhook the right and left claws of the front cover.



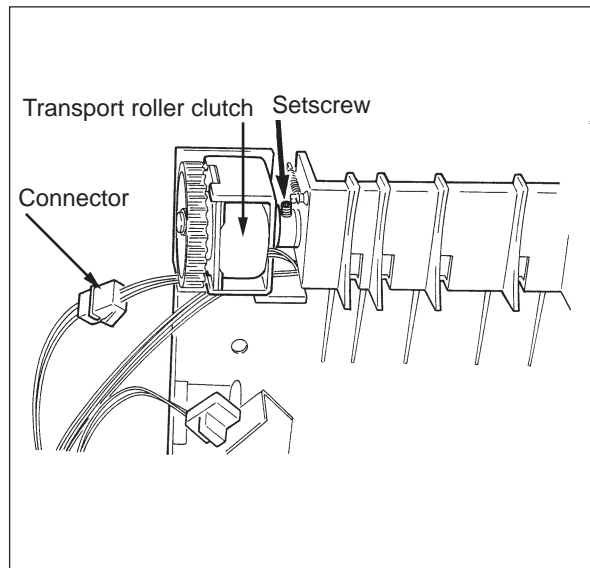
View with copier taken off

13.4.2 Transport rollers (right)/(left), paper stop switch, transport roller clutch and door switch

(1) Remove the paper guide.

Transport roller clutch:

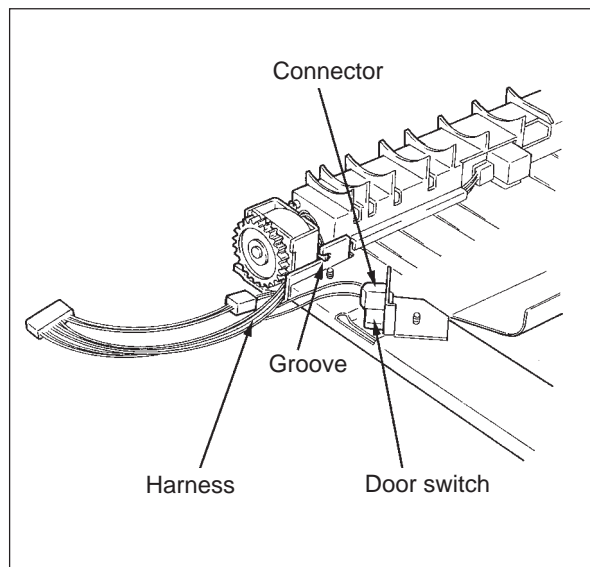
- (1) Disconnect one connector.
- (2) Loosen one setscrew.



- Notes:**
1. When reassembling the clutch, fit the clutch's projection into the groove shown securely and fasten the set-screw.
 2. The clutch harness should be passed under the clutch as shown.

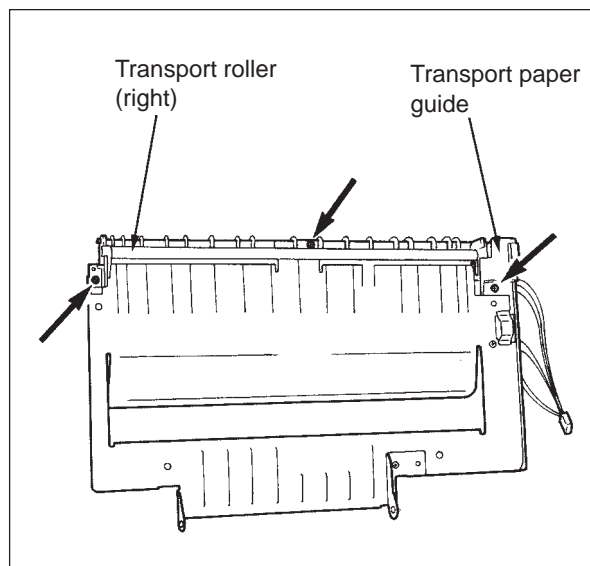
Door switch:

- (1) Disconnect its connector, unhook its claws and the switch can be taken out.



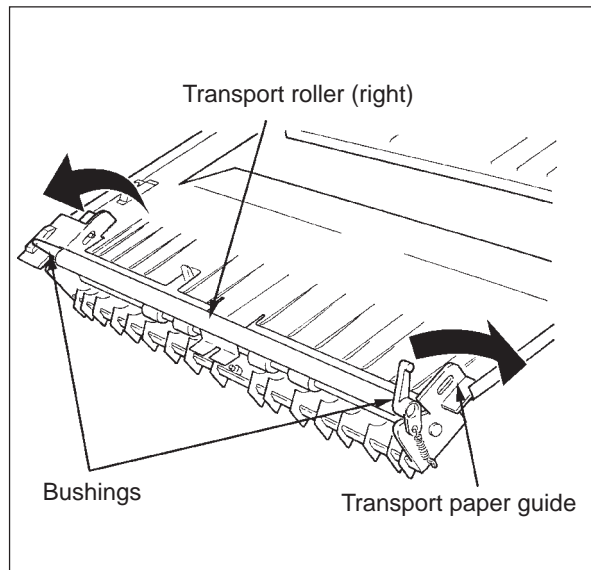
Transport rollers (right)/(left) and paper stop switch:

- (1) Remove the transport roller clutch.
- (2) Remove the transport paper guide (3 screws).



- (3) While bending the transport guide in the direction of the arrow, remove the bushings from the frame

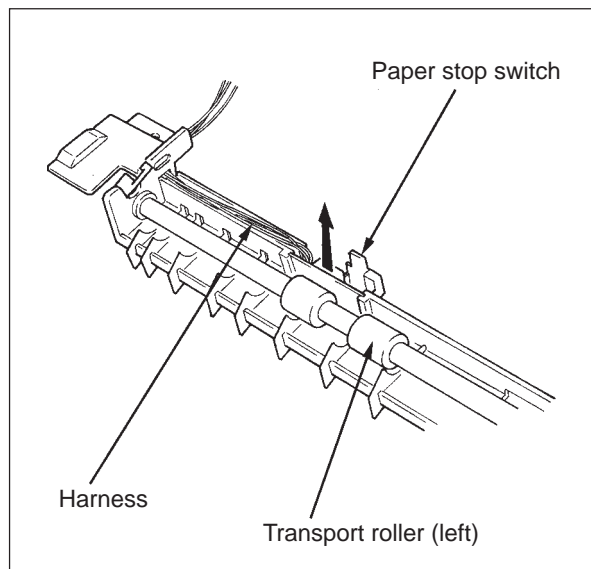
..... both front and rear, and the transport roller (right) can be taken out along with the bushings.



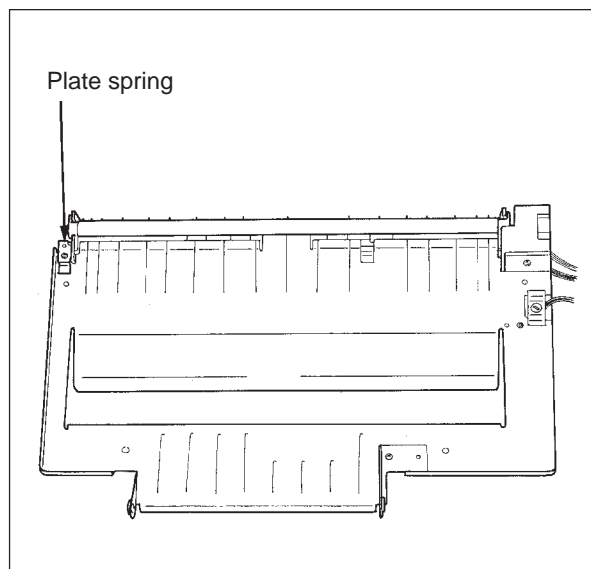
- (4) Take out the bushings and the transport roller (left).

- (5) Take out the paper stop switch along with the guide.

Notes: 1. During reassembly, fit the switch harness into the groove securely.
2. When reassembling the switch, pay attention to its orientation.



3. When reinstalling the transport paper guide, make sure that the plate spring is in contact with the shaft of the transport roller (right) securely.

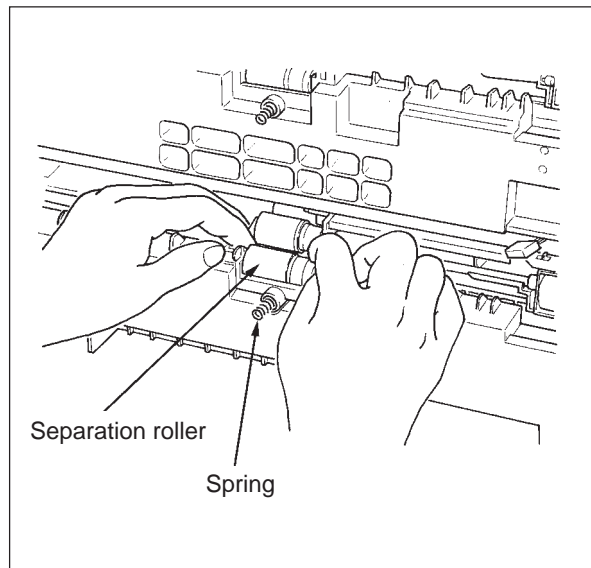


13.4.3 Separation, pick-up and feed rollers

- (1) Remove the cassette.
- (2) Remove the paper guide.

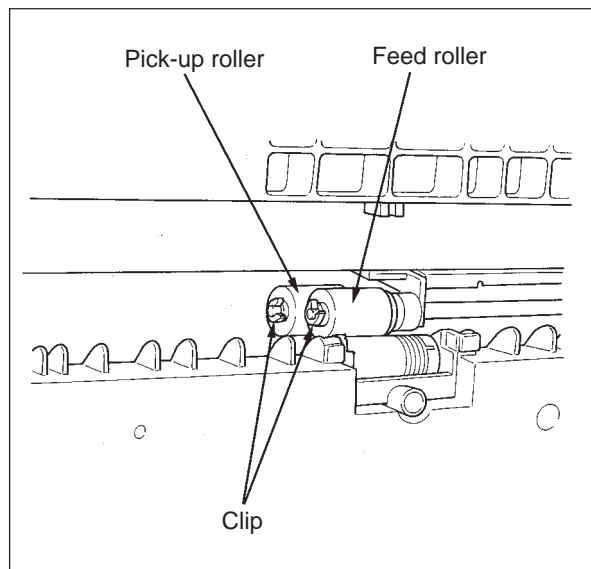
Separation roller:

- (1) It can be taken out if you pull it toward you.



Pick-up and feed rollers:

- (1) Snap off the clips and slide out the pick-up roller from its shaft. The feed roller can be removed by the same procedure.

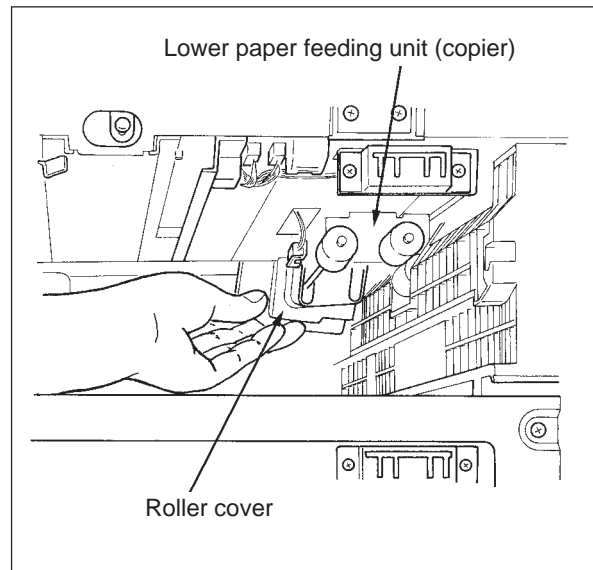


Note: The separation, pick-up and feed rollers are the same parts as used in the copier.

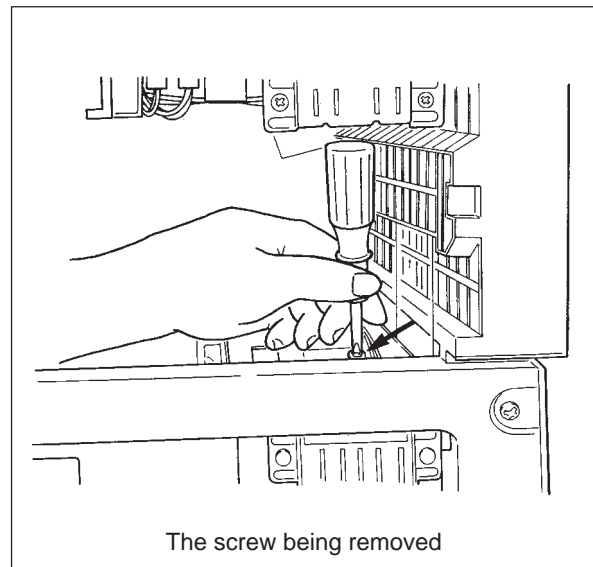
Caution: During disassembly or reassembly, be careful not to lose the spring.

13.4.4 Lower paper feeding unit

- (1) Remove the copier's cassette and the paper feeding unit's cassette.
- (2) Remove the roller cover (on the copier side) of the paper feeding unit.

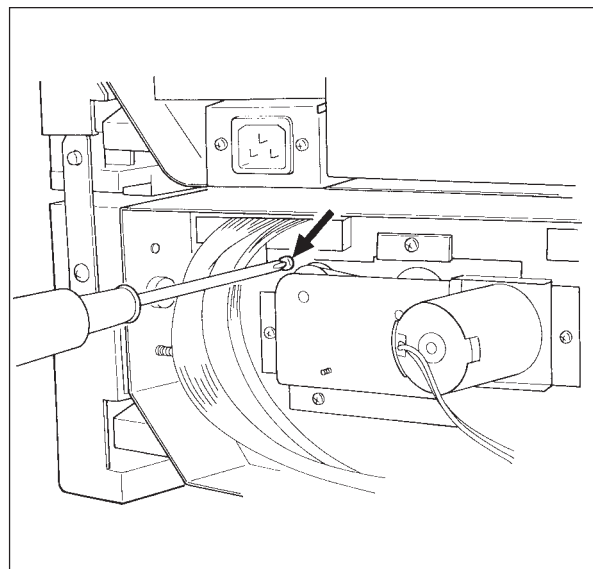


- (3) Remove one screw from the lower paper feeding unit.



- (4) Remove the feed roller.
- (5) Remove the rear cover.
- (6) Remove one screw and then take out the whole unit toward the front.

Note: Since the disassembly and replacement procedures for the pick-up roller clutch, feed roller clutch and pick-up roller are the same as for those of the copier, refer to para. 8.3.2.



13.4.5 Drive motor and drive PC board

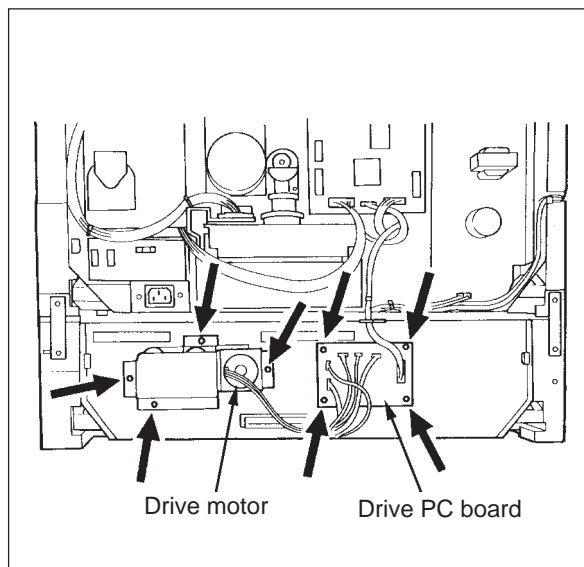
(1) Remove the rear cover.

Drive PC board:

(1) After disconnecting six connectors, remove the PC board from its four lock supports.

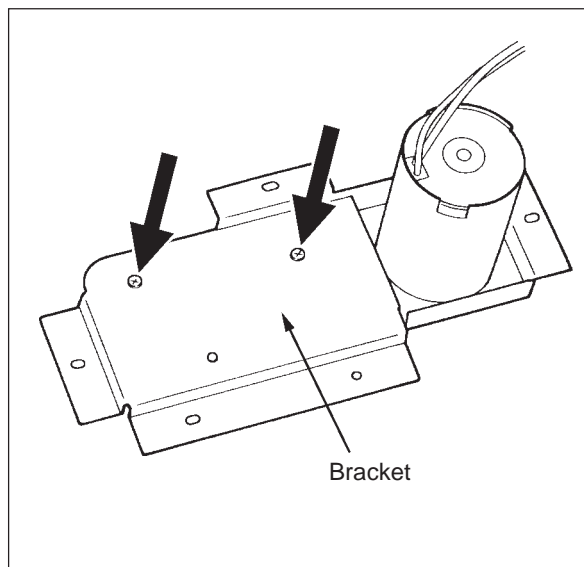
Drive motor:

(1) Disconnect one connector from the drive PC board.
(2) Remove four screws and take out the motor assembly.



(3) Remove the bracket (2 screws).

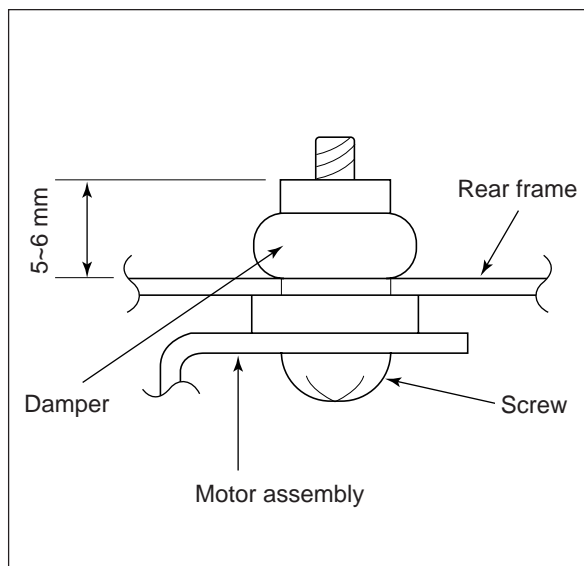
(4) Remove three screws.



Note: When installing the motor assembly to the rear frame, take the following precaution.

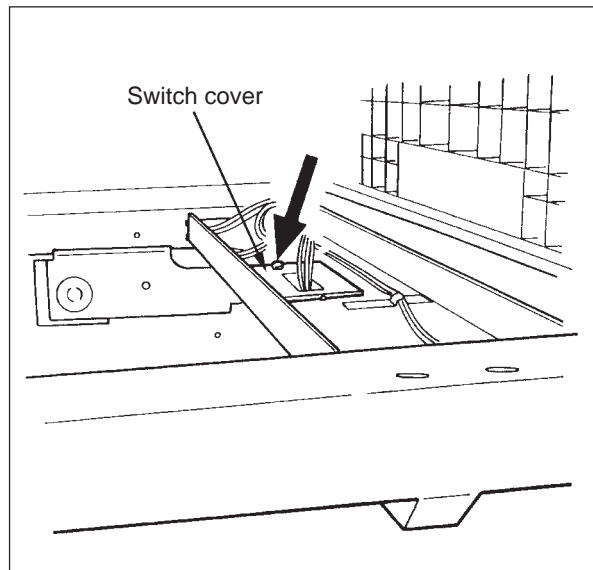
Tighten respective screws so that the front edge of the damper should be down by 5~6 mm from the frame surface.

(Overtightening can damage the damper.)

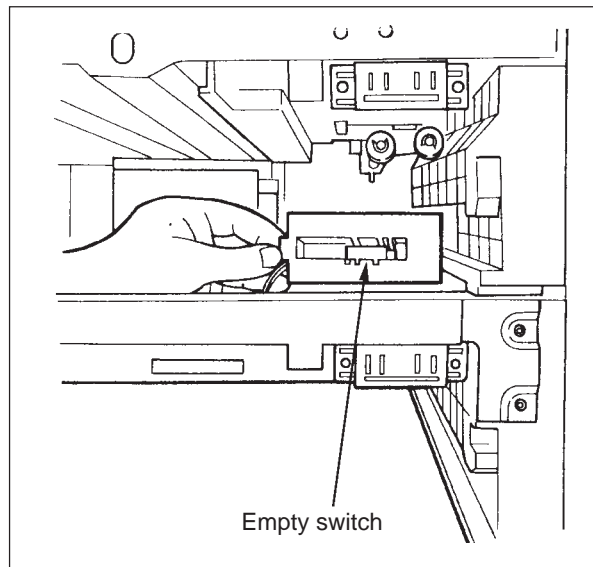


13.4.6 Empty switch

- (1) Pull out the cassettes from both the copier and the paper feeding unit.
- (2) Remove one screw and take out the switch along with the cover.

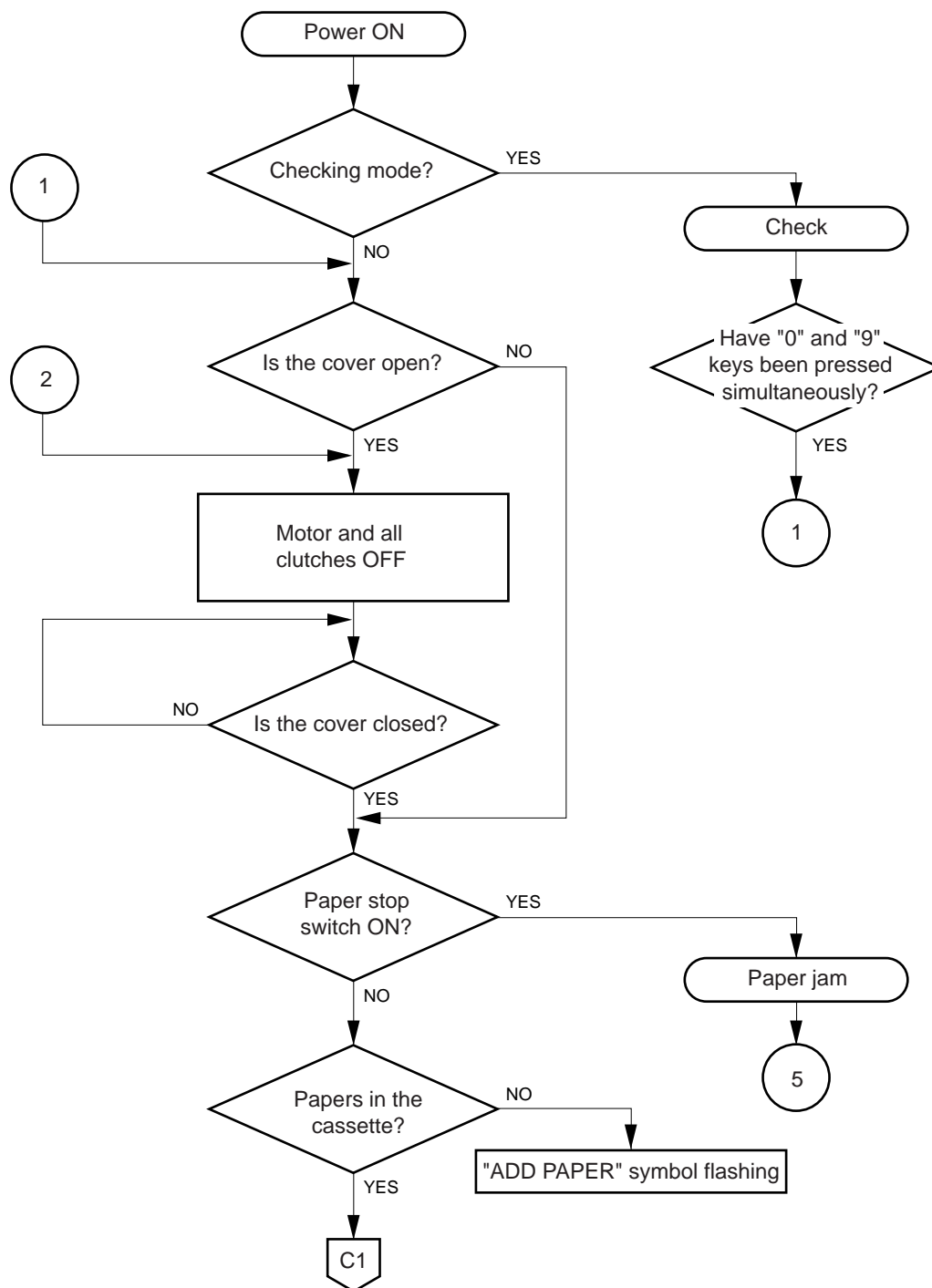


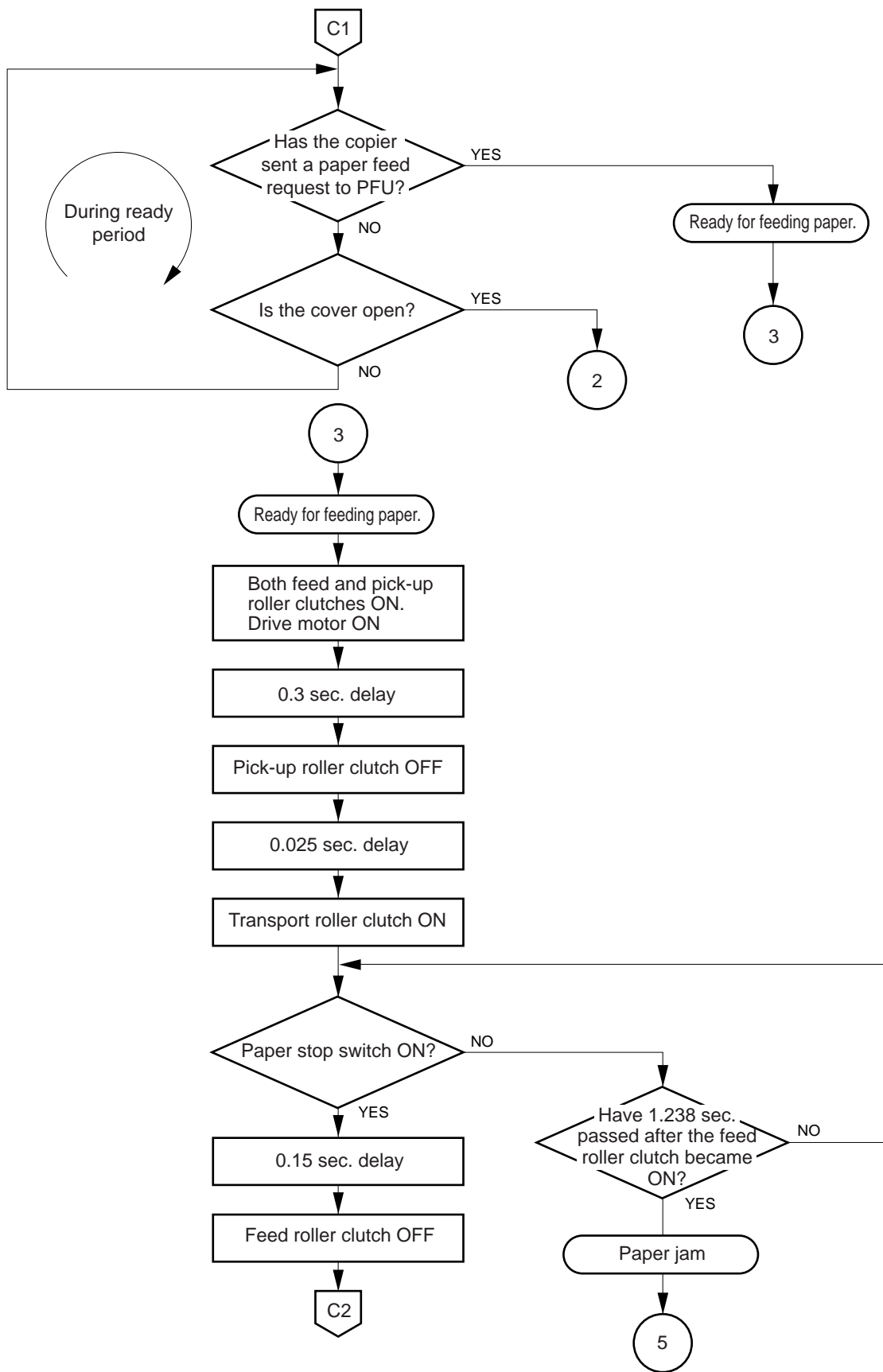
- (3) Detach the switch from the cover.

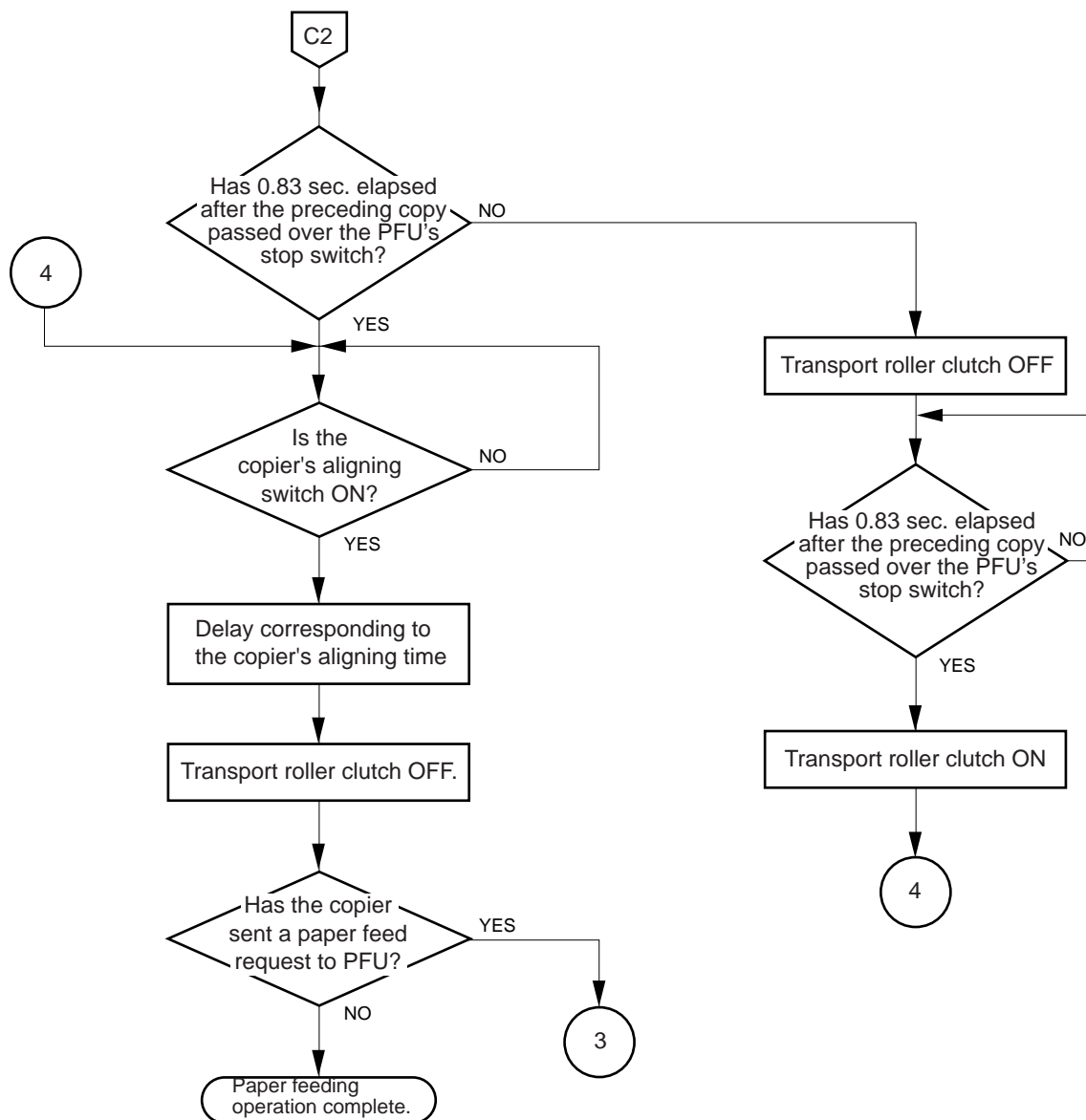


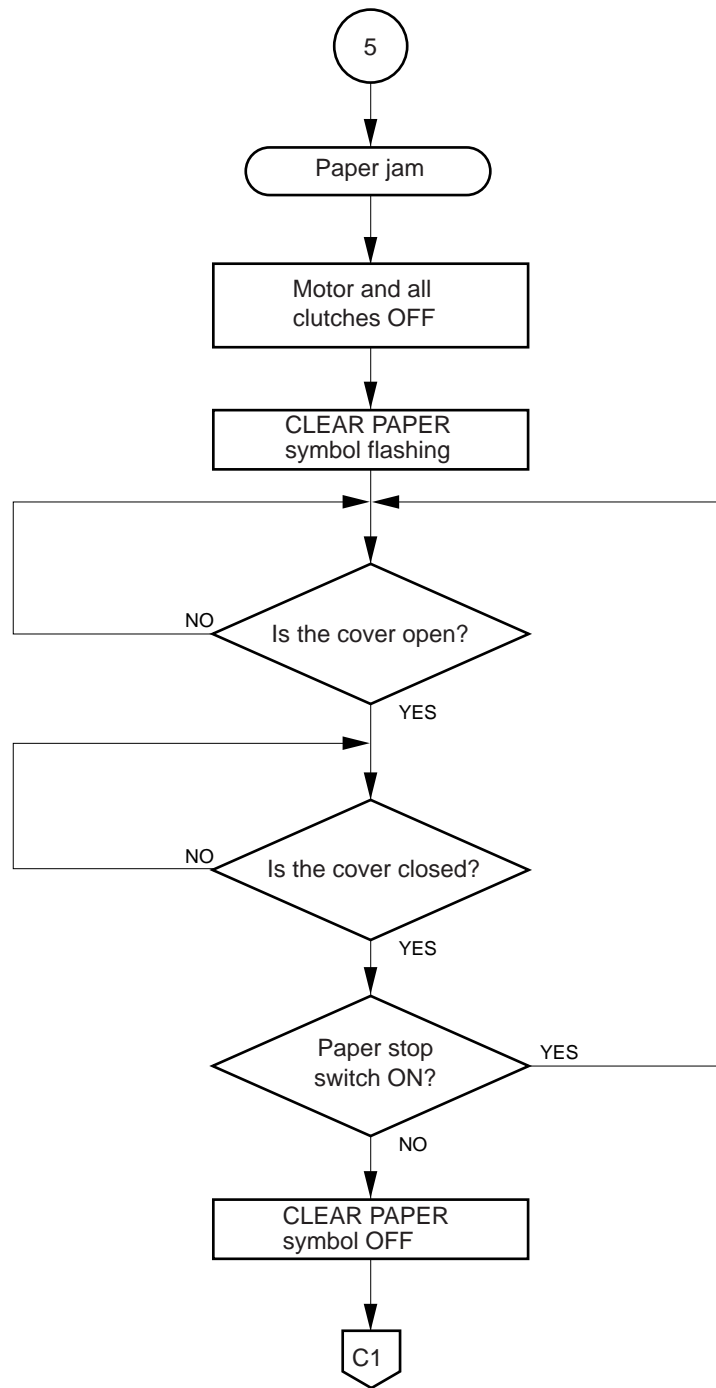
13.5 Flow Charts and Timing Charts

13.5.1 Flow chart



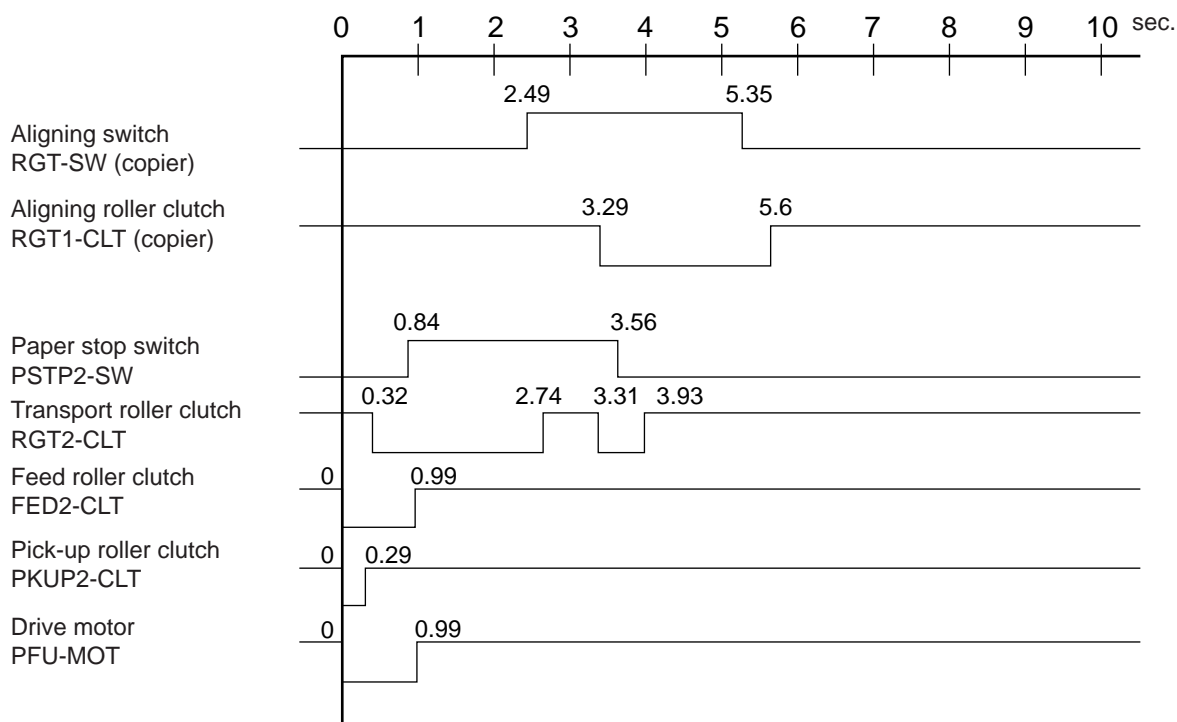




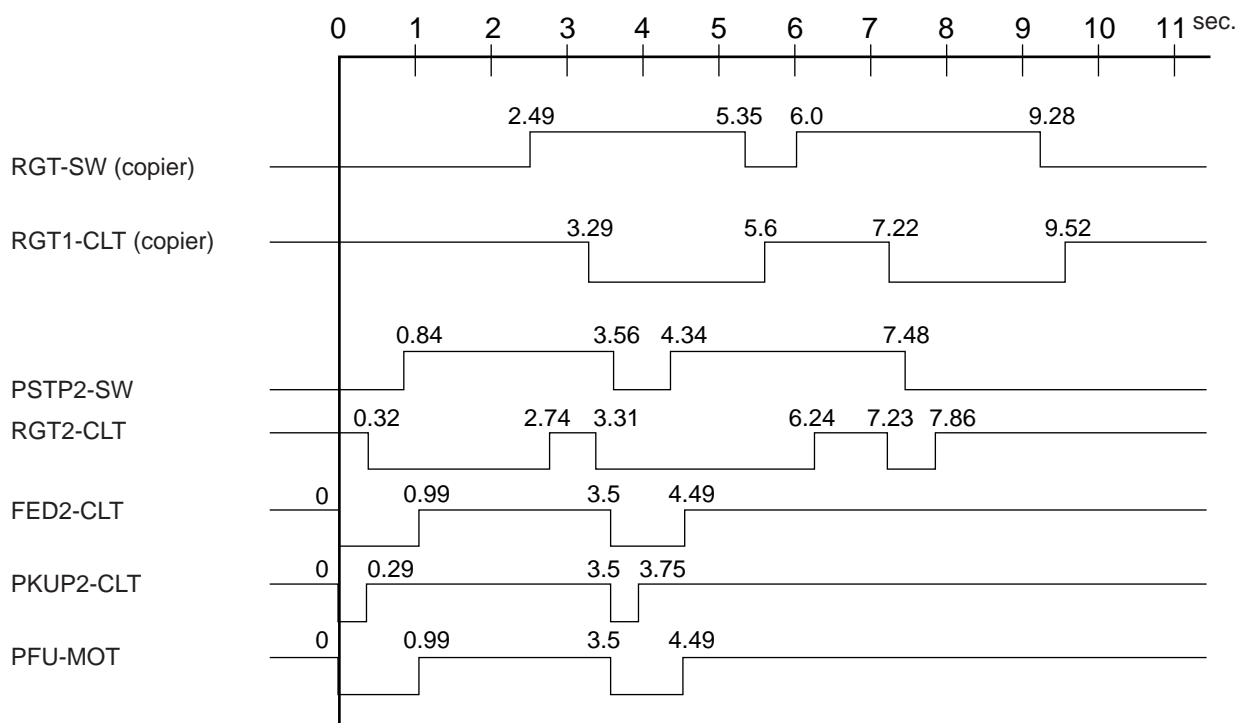


13.5.2 Timing chart

A4 lateral single-sheet copying (PFU)



A4 lateral two-sheets copying (PFU)



13.6 Explanation of Circuits

13.6.1 Interface signals

[A] Signals from the copier to the paper feeding unit (PFU):

(1) RGT-CLT2

Drives the transport roller clutch.

When the signal is "L", the clutch (RGT2-CLT) energizes.

(2) PKUP-CLT2

Drives the pick-up clutch.

When the signal is "L", the pick-up roller clutch (PKUP2-CLT) energizes.

(3) FED-CLT2

Drives the paper feed roller.

When the signal is "L", the clutch (FED2-CLT) energizes, causing the paper feed roller to start rotating.

(4) MOT-ON2

Rotates the drive motor.

When the signal is "L", the drive motor (PFU-MOT) starts rotating.

[B] Signals from the paper feeding unit (PFU) to the copier:

(1) CST2 (installation)

Tells the copier that PFU is installed. The signal becomes "L" with PFU installed.

(2) DR-SW2 (door switch)

Indicates whether or not the PFU's side cover is open. When the cover is closed, the door switch is turned on, causing the signal to become "L".

(3) FED-SW2 (paper stop switch)

Indicates the status of the PFU's paper stop switch. When there is paper on the paper stop switch, it is turned on, causing the signal to become "H".

(4) EMP-SW2 (paper empty switch)

Indicates whether or not there is paper in the PFU's cassette. When there is paper, the paper empty switch is turned on, causing the signal to become "L".

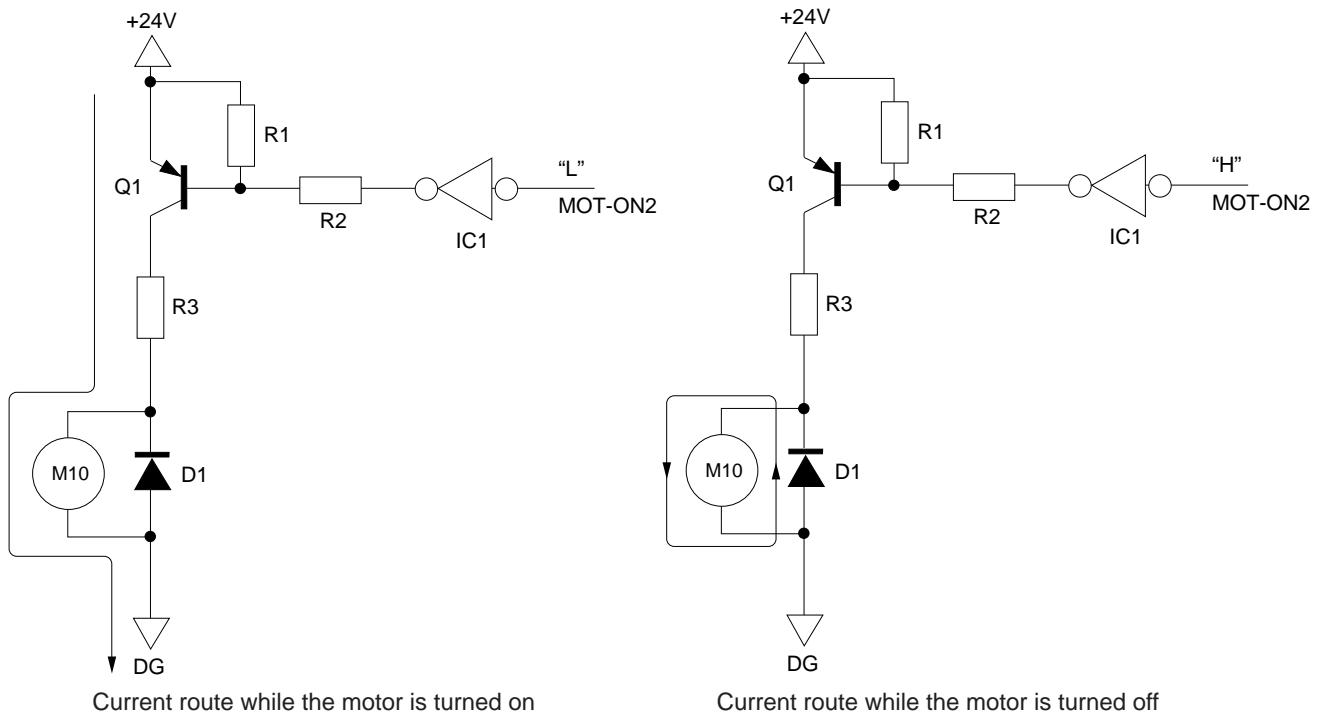
(5) SIZ13 - 10 (Paper size switches)

Indicate the size of the cassette. When the size mark plate pushes the switches, the corresponding paper size signal becomes "L".

13.6.2 Driving of the drive motor

The drive motor M10 (PFU-MOT) is driven by transistor Q1 as described below:

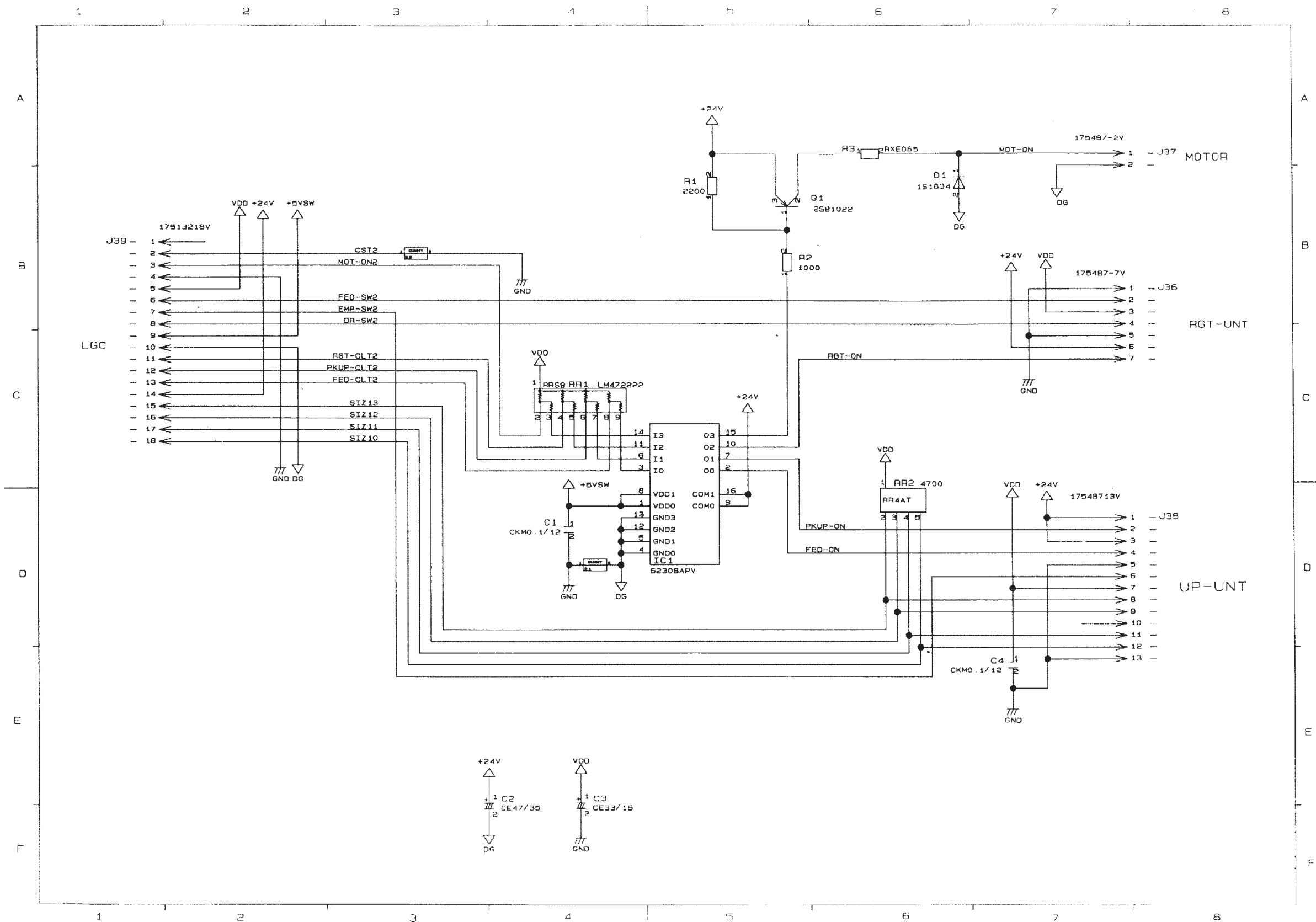
When the signal MOT-ON2*1 from the copier becomes "L", an "L" voltage is applied to the base of Q1, Q1 is turned on, causing current to flow from +24V→Q1's emitter→Q1's collector→R3→DG. This will cause the drive motor M10 (PFU-MOT) to rotate. When the MOT-ON2 signal becomes "H", Q1 is turned off, shutting off the above current route. But while the motor continues to rotate due to its inertia, current also tries to continue to flow, causing a voltage to be generated between the input and output terminals of the motor. Since this voltage is applied between the anode and cathode of D1, the inverse electromotive voltage occurring in the motor is short-circuited and restricted.



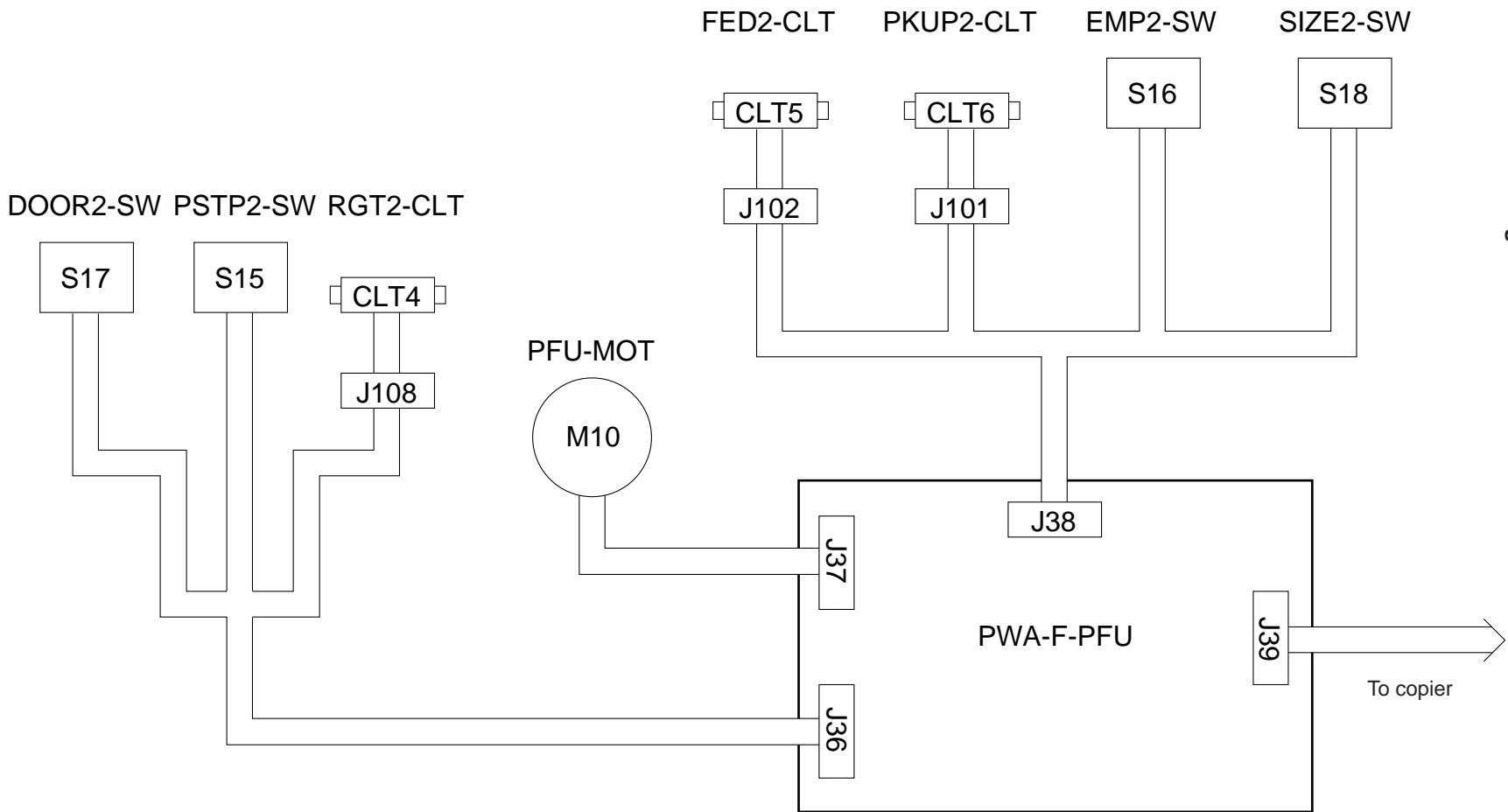
*1: The MOT-ON2 signal is to cause the motor (PFU-MOT) M10 to rotate and is supplied by the copier. When this signal becomes "L", the motor starts rotating.

13.7 Electric Circuit Diagram and PC Board Assembly

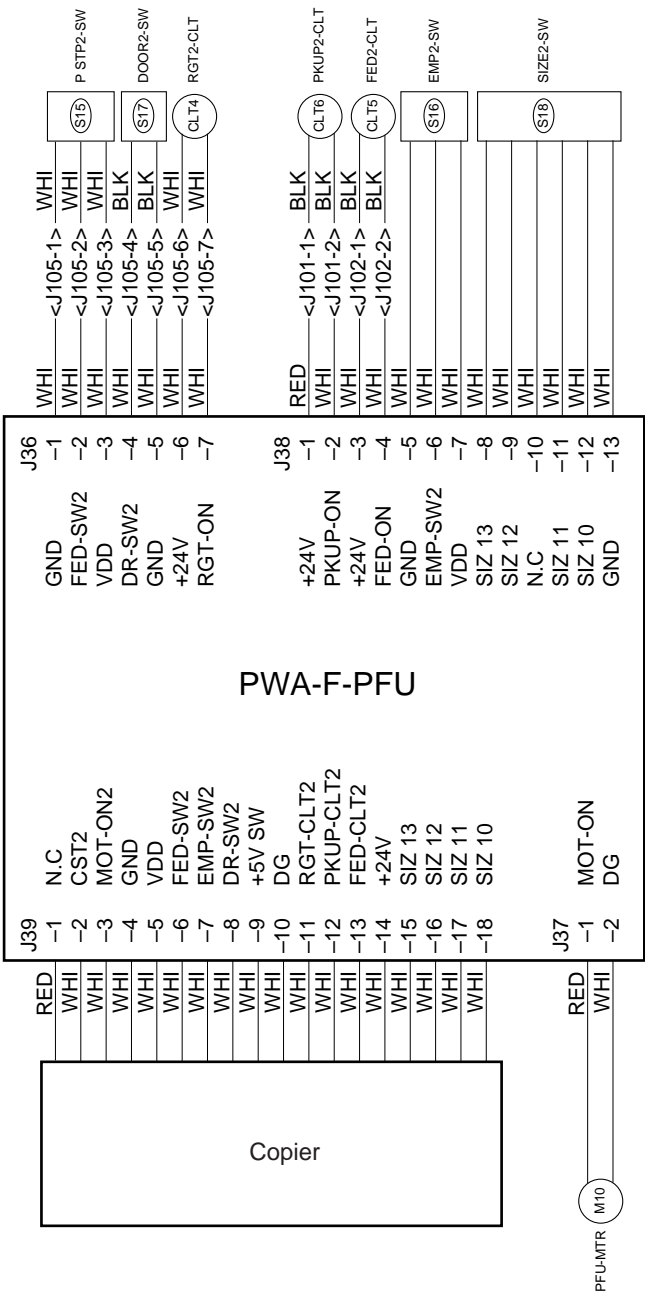
13.7.1 PFU drive circuit diagram



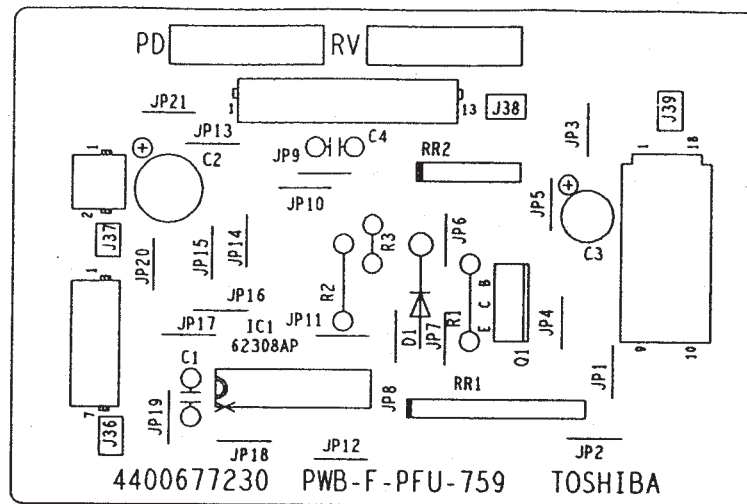
13.7.2 Harness location diagram



13.7.3 **Harness connection diagram**



13.7.4 PC board assembly (PWA-F-PFU)



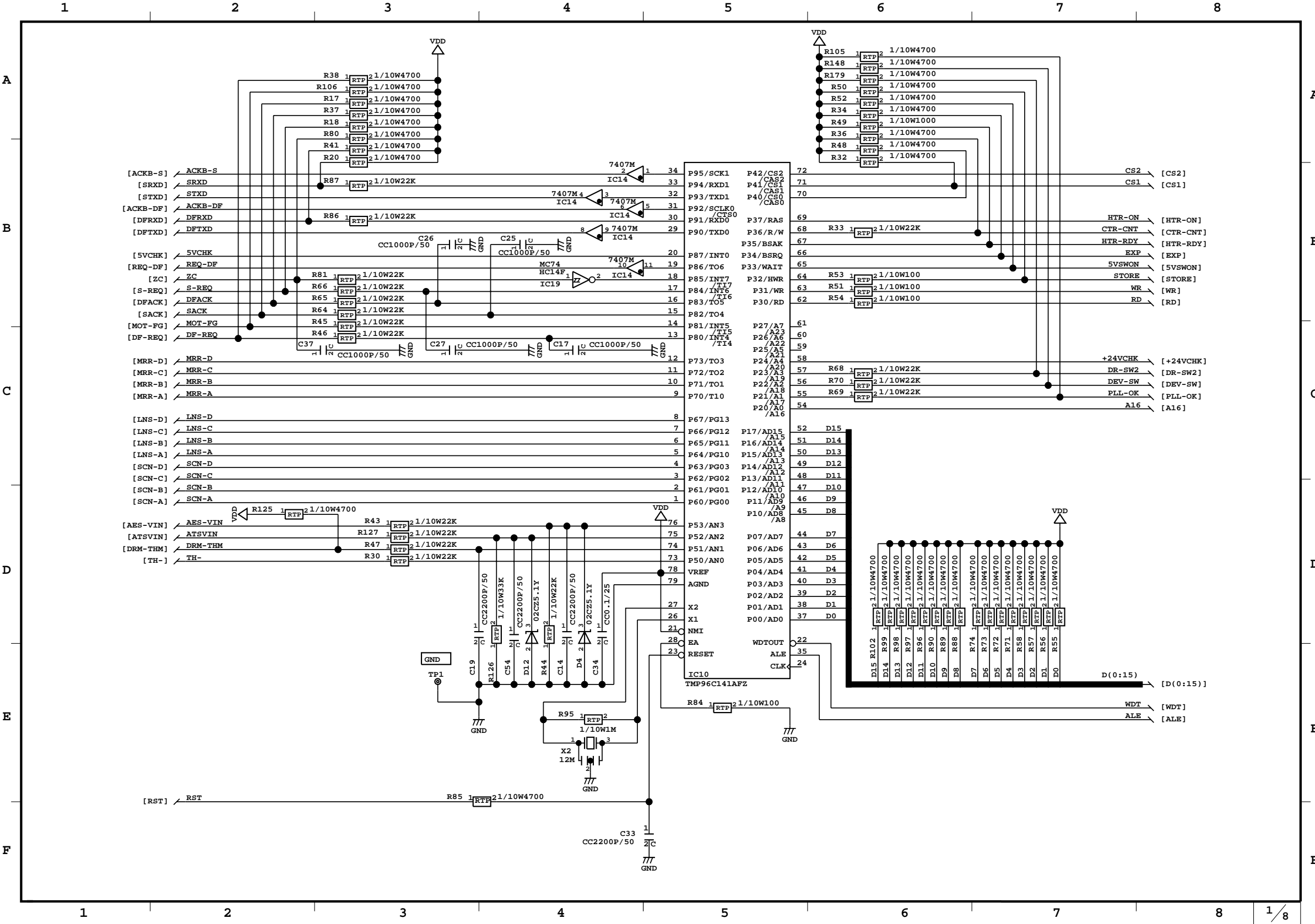
14. ELECTRIC CIRCUIT DIAGRAM

14.1 Logic Circuit

14.1.1 1550 Logic Circuit (PWA-F-LGC) 1/8



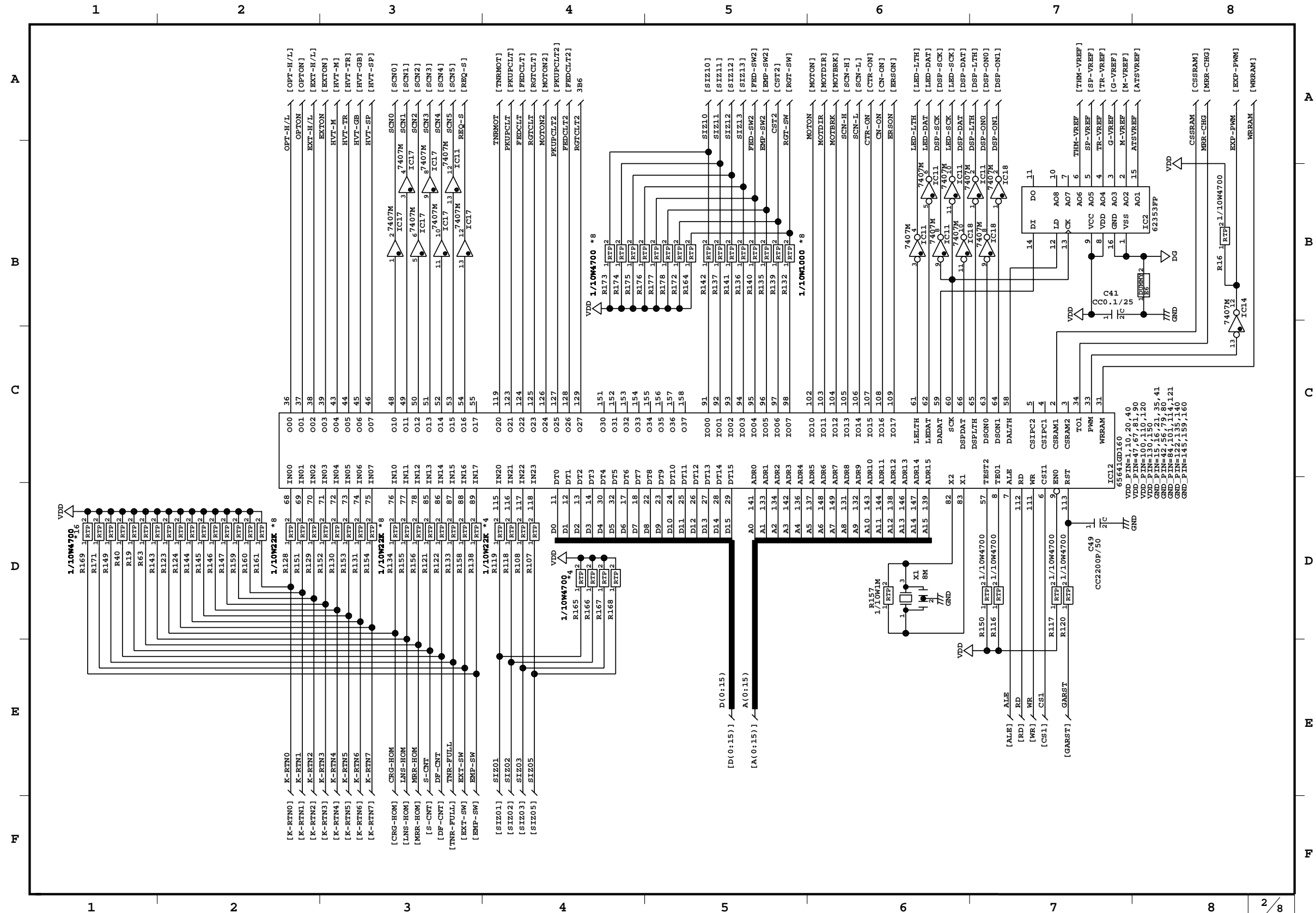
HINT
How to search for where a signal in a circuit diagram has jumped to.





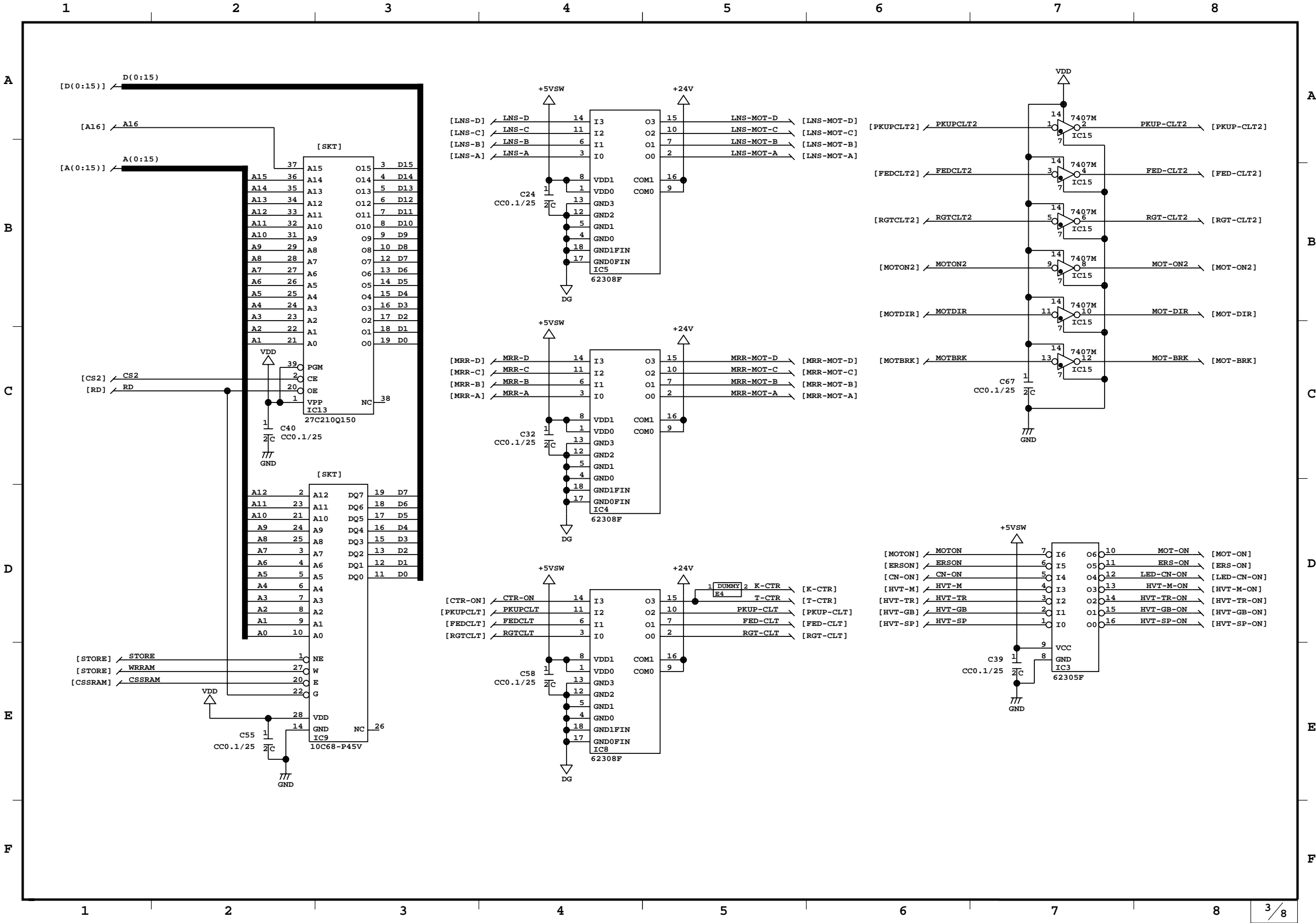
HINT

How to search for where a signal in a circuit diagram has jumped to.



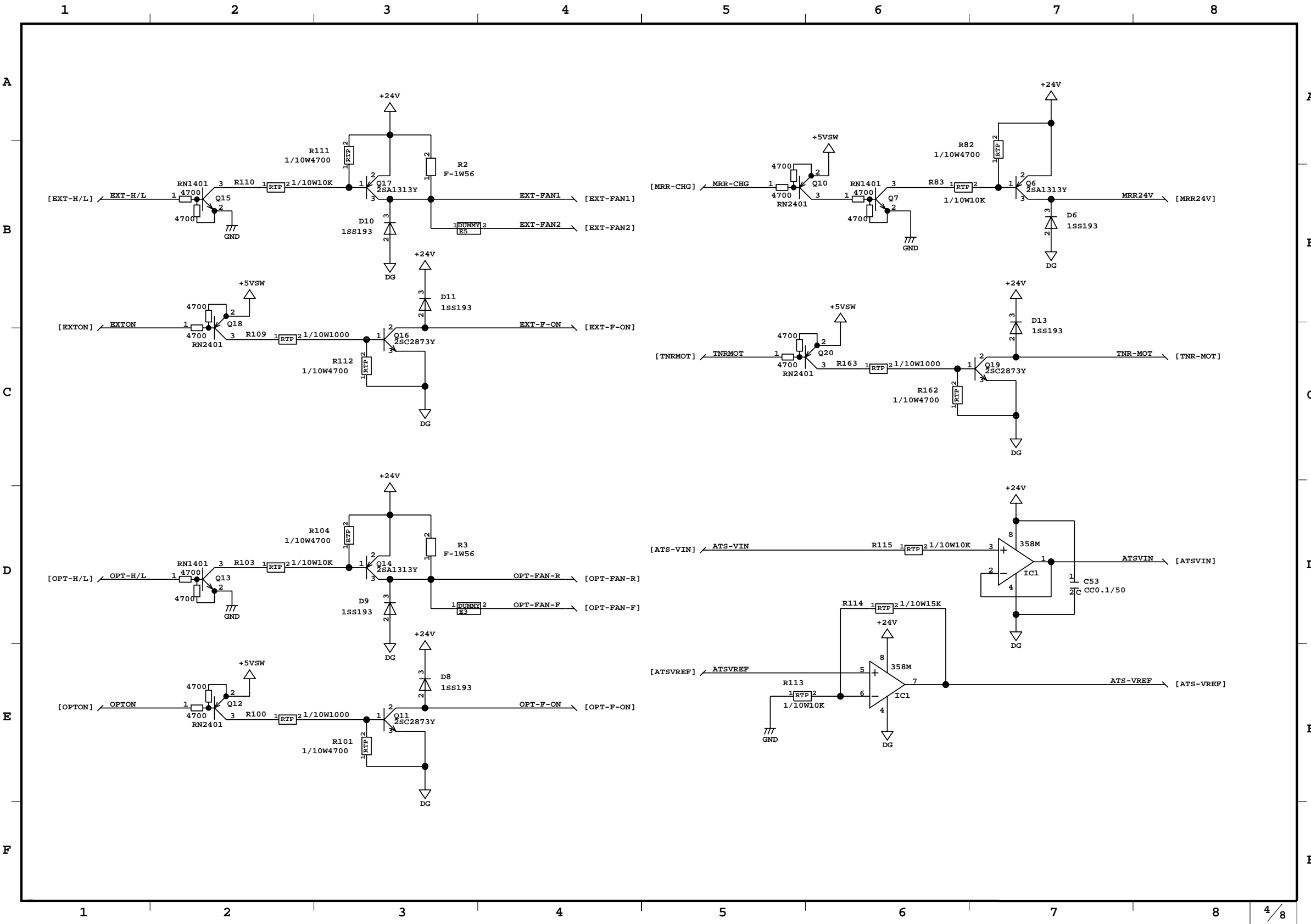


HINT
How to search for where a signal in a circuit diagram has jumped to.





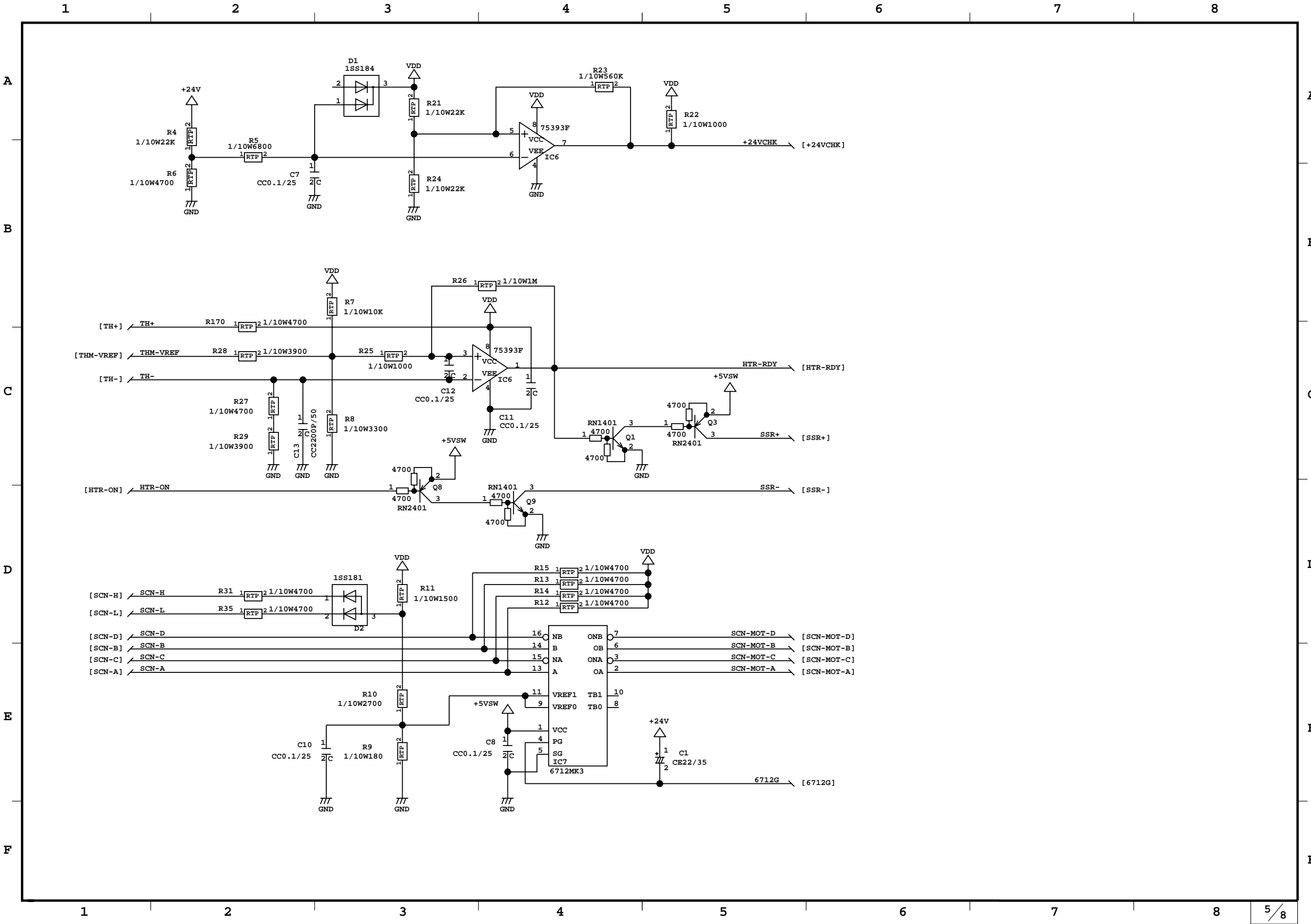
HINT
How to search for where a signal in a circuit diagram has jumped to.



Logic Circuit (PWA-F-LGC) 5/8



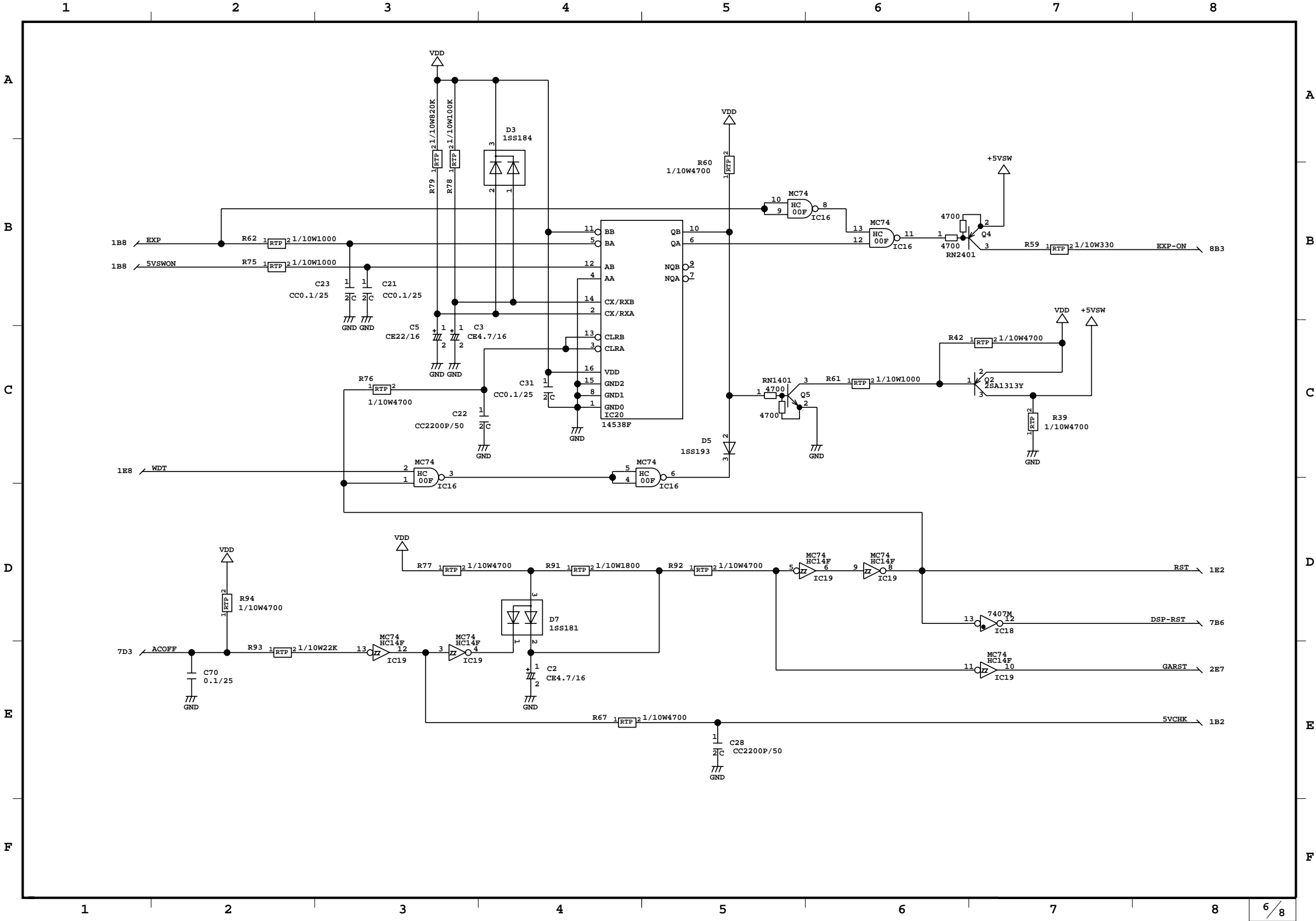
HINT
How to search for where a signal in a circuit diagram has jumped to.



Logic Circuit (PWA-F-LGC) 6/8



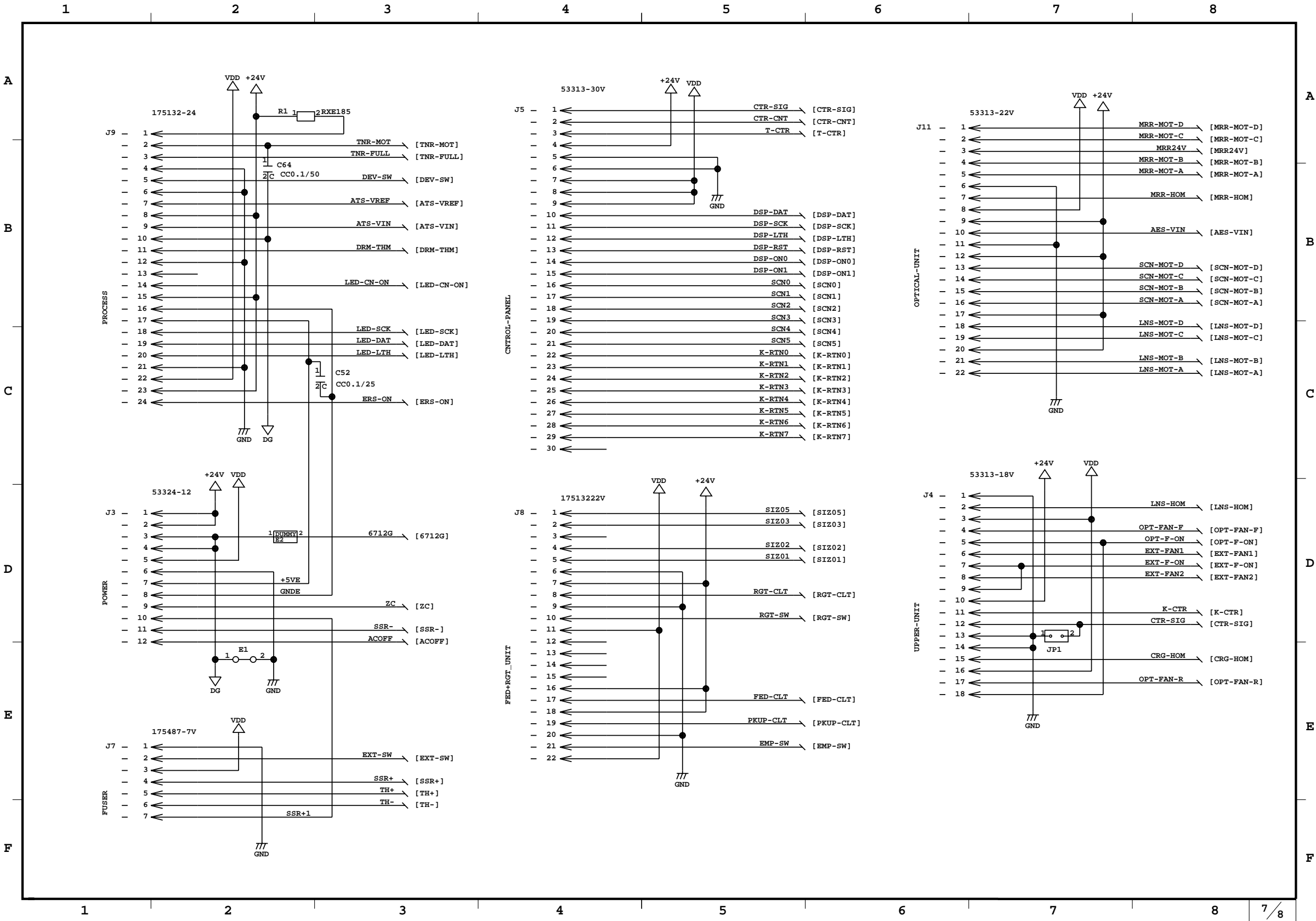
HINT
How to search for where a signal in a circuit diagram has jumped to.



Logic Circuit (PWA-F-LGC) 7/8

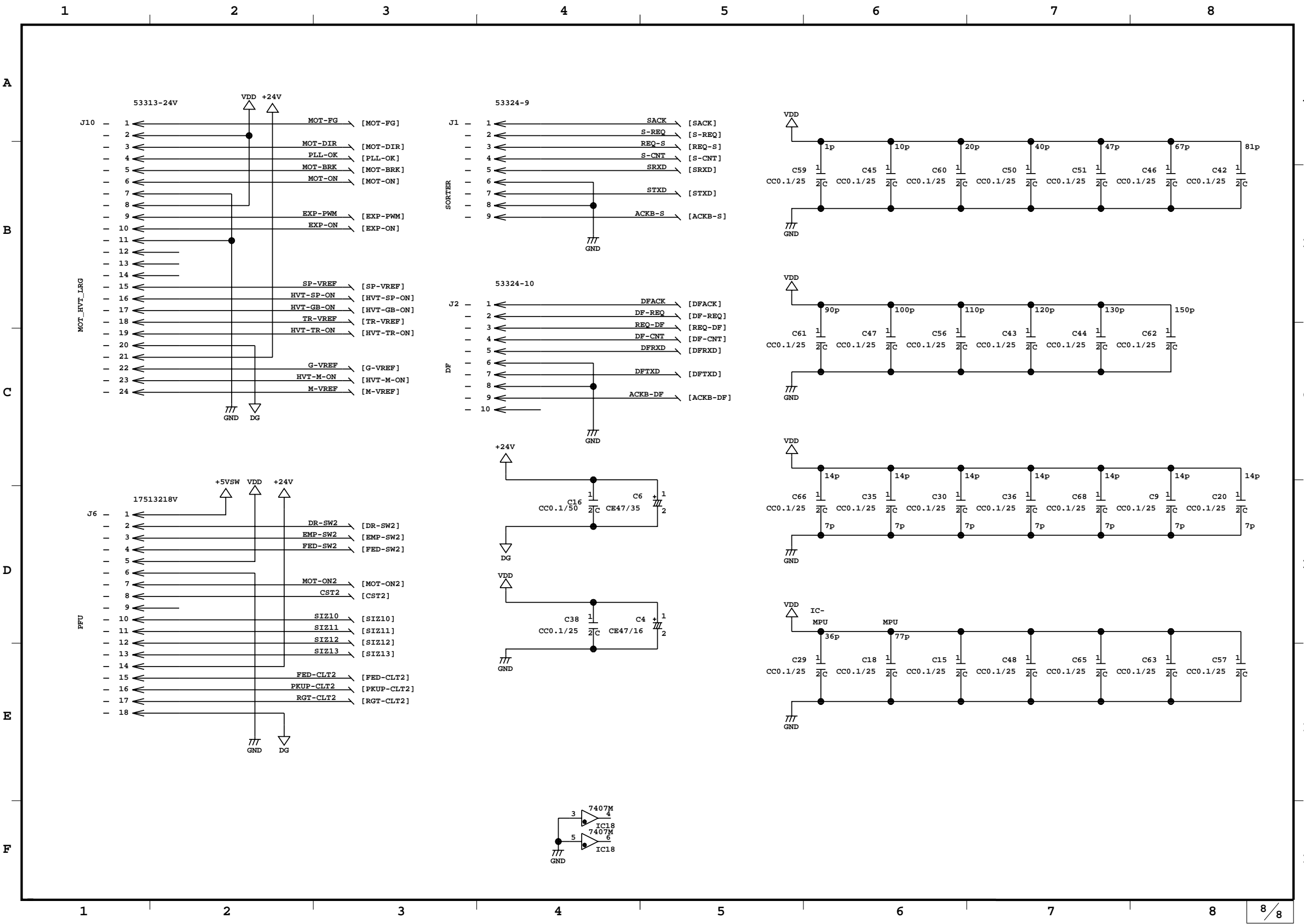


HINT
How to search for where a signal in a circuit diagram has jumped to.





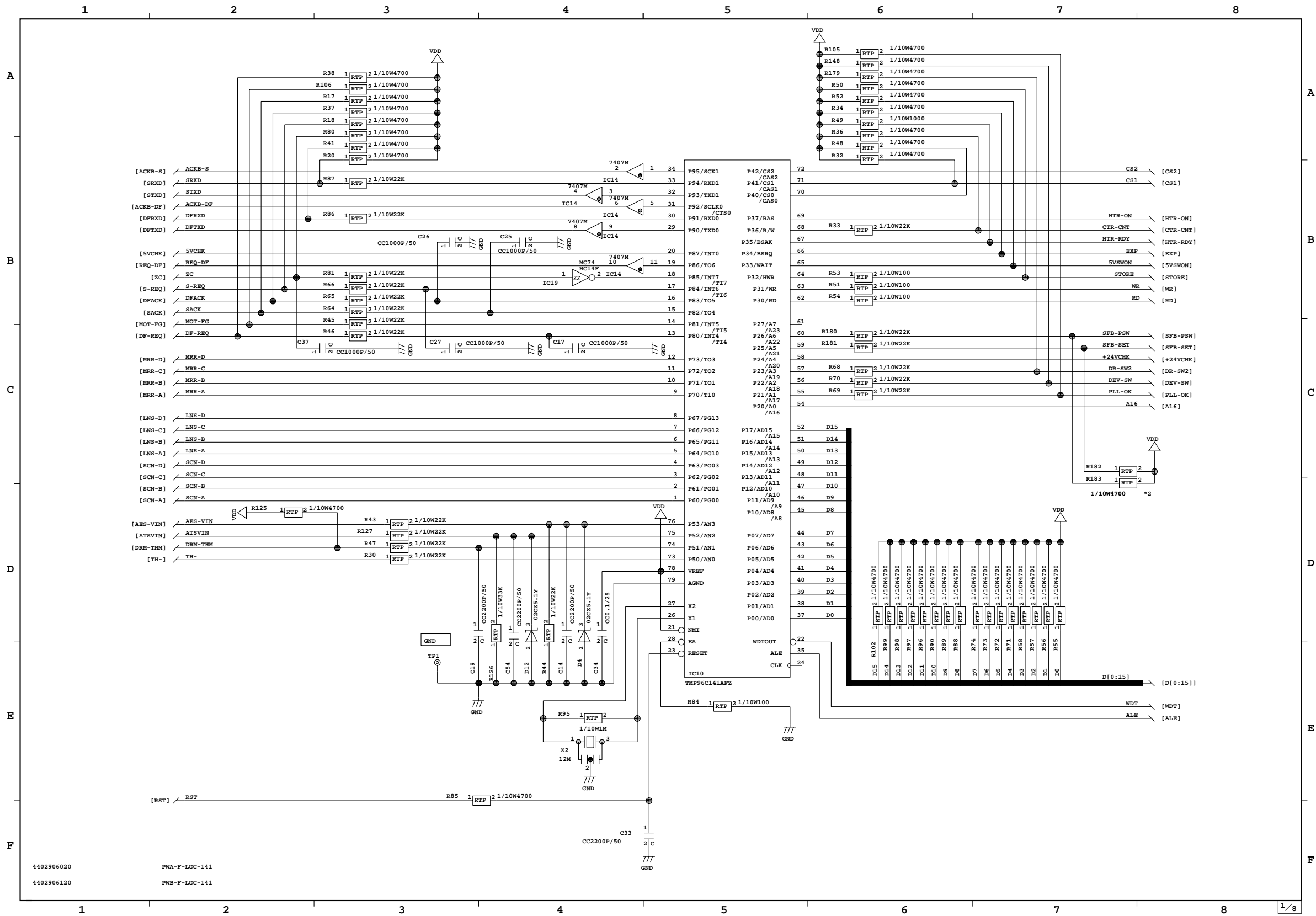
HINT
How to search for where a signal in a circuit diagram has jumped to.



14.1.2 1560 Logic Circuit (PWA-F-LGC) 1/8



HINT
How to search for where a signal in a circuit diagram has jumped to.

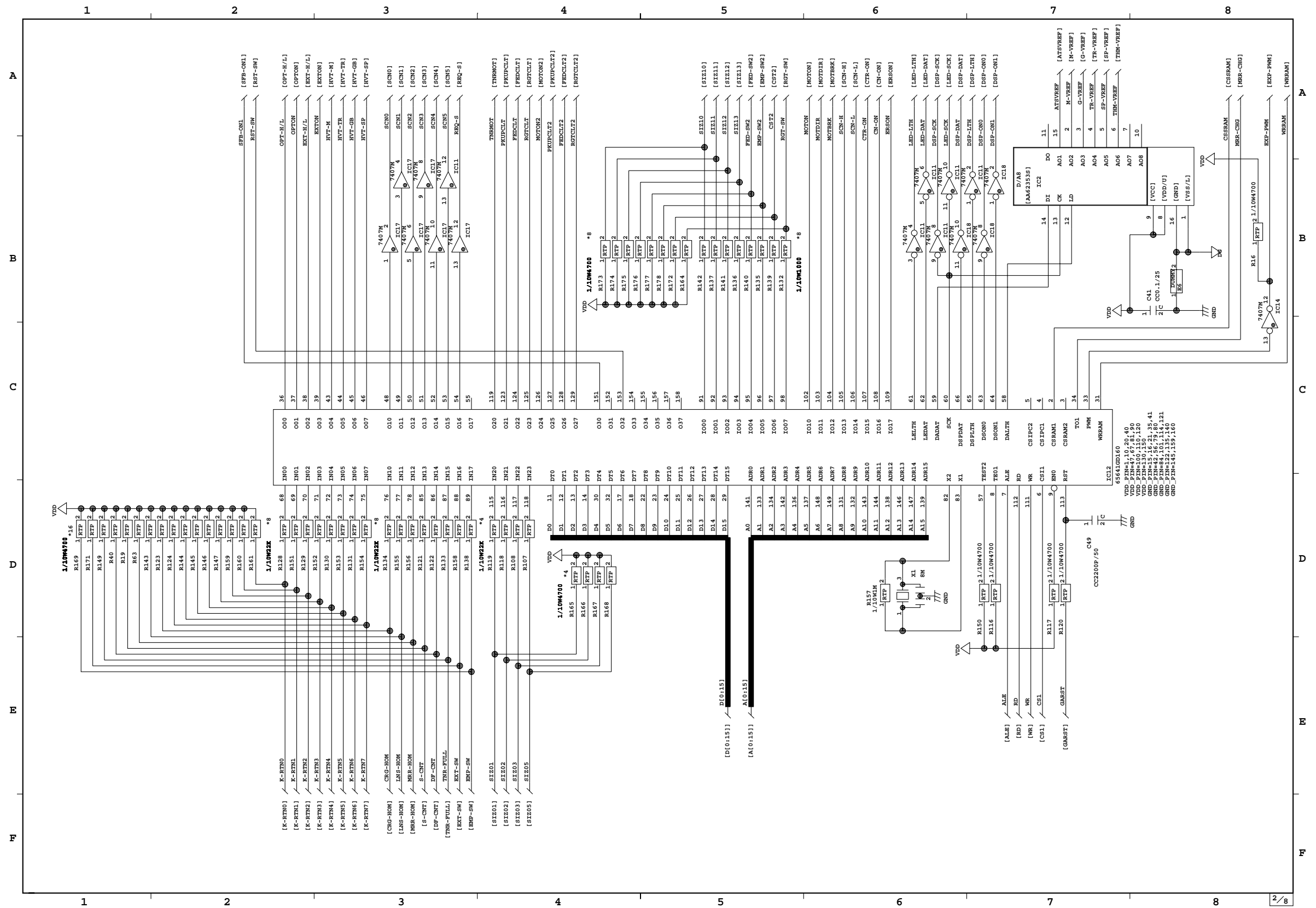


1550/1560 CIRCUIT DIAGRAMS



HINT

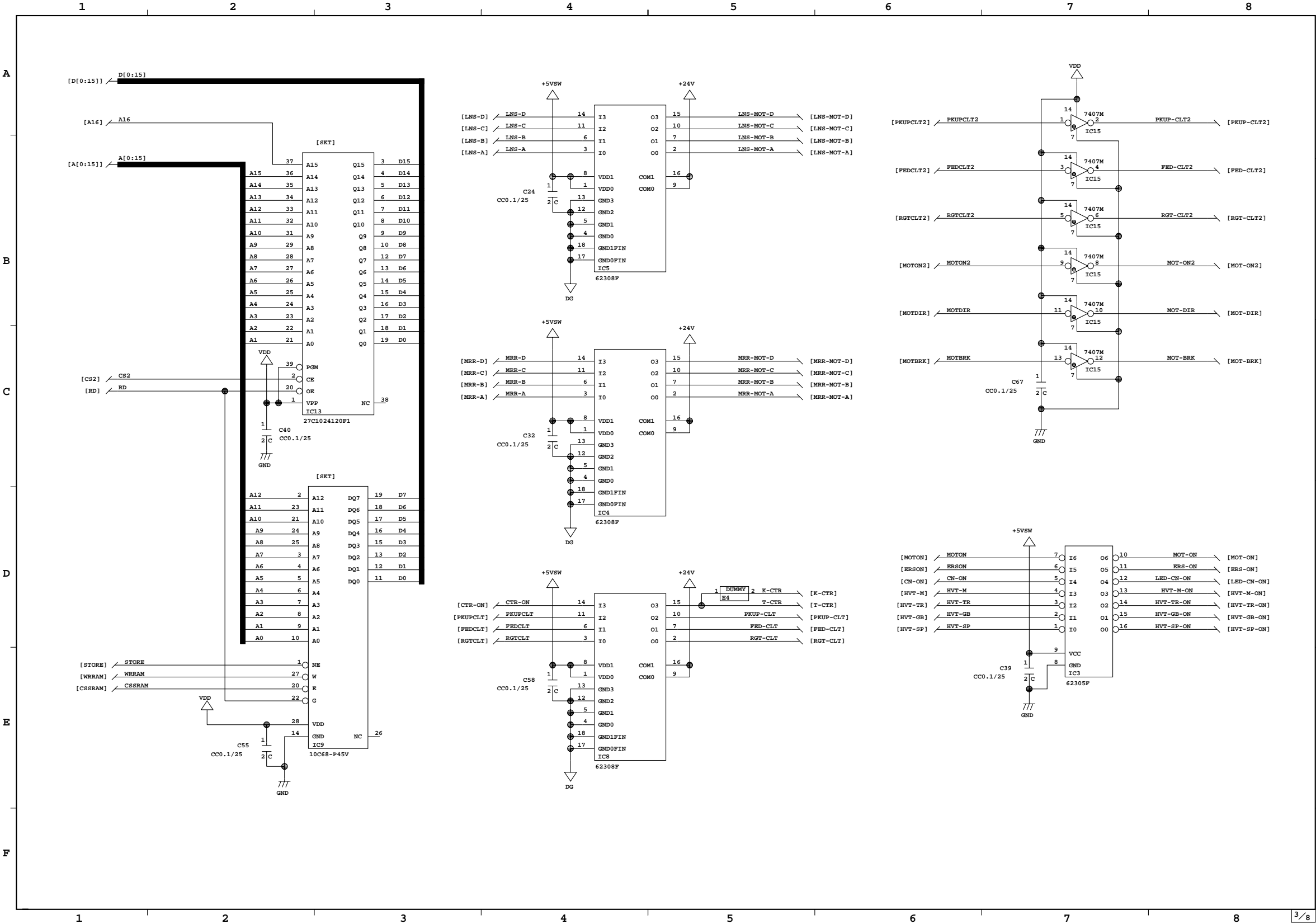
How to search for where a signal in a circuit diagram has jumped to.



1560 Logic Circuit (PWA-F-LGC) 3/8



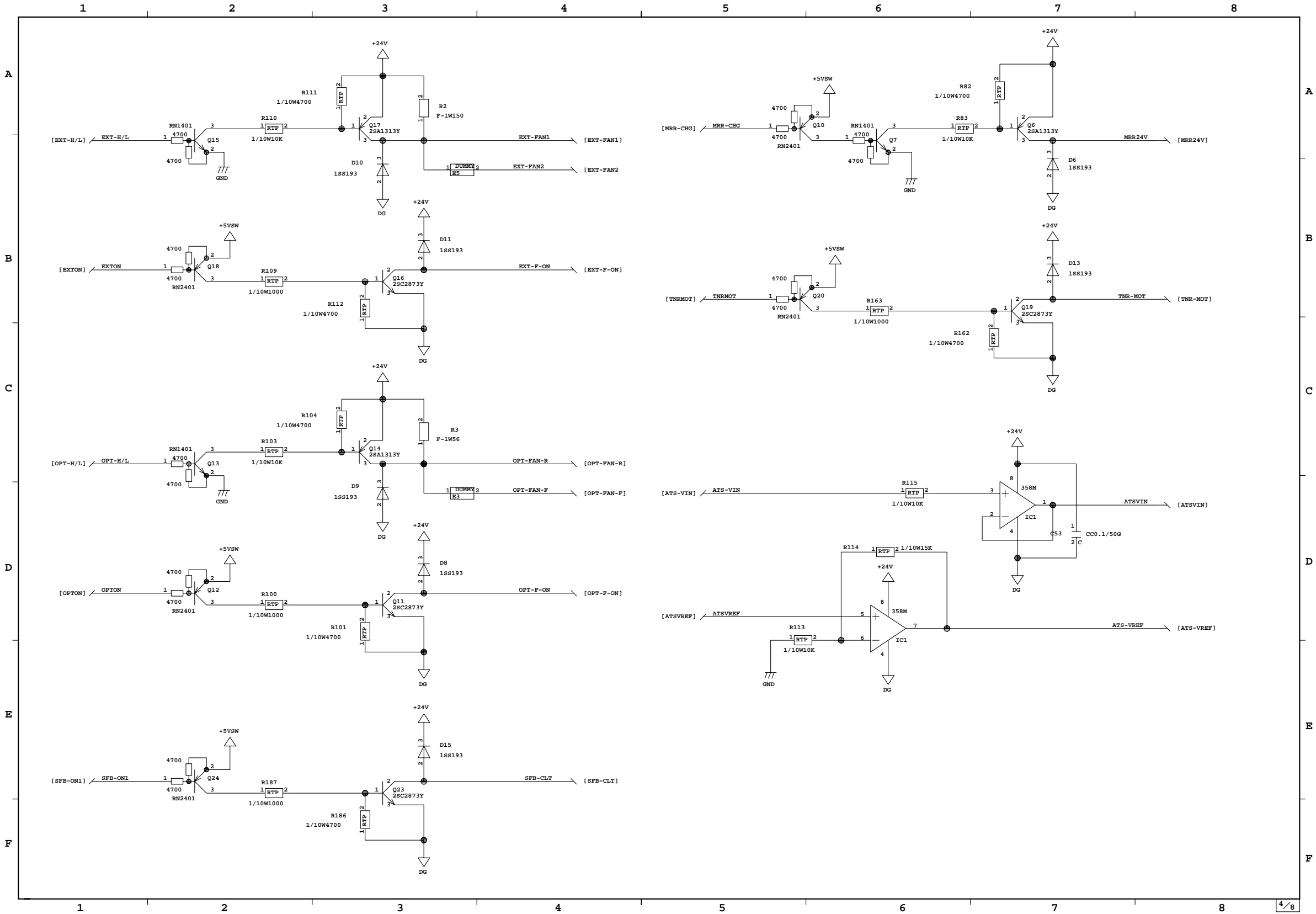
HINT
How to search for where a signal in a circuit diagram has jumped to.



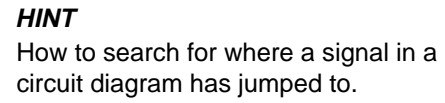
1560 Logic Circuit (PWA-F-LGC) 4/8



HINT
How to search for where a signal in a circuit diagram has jumped to.



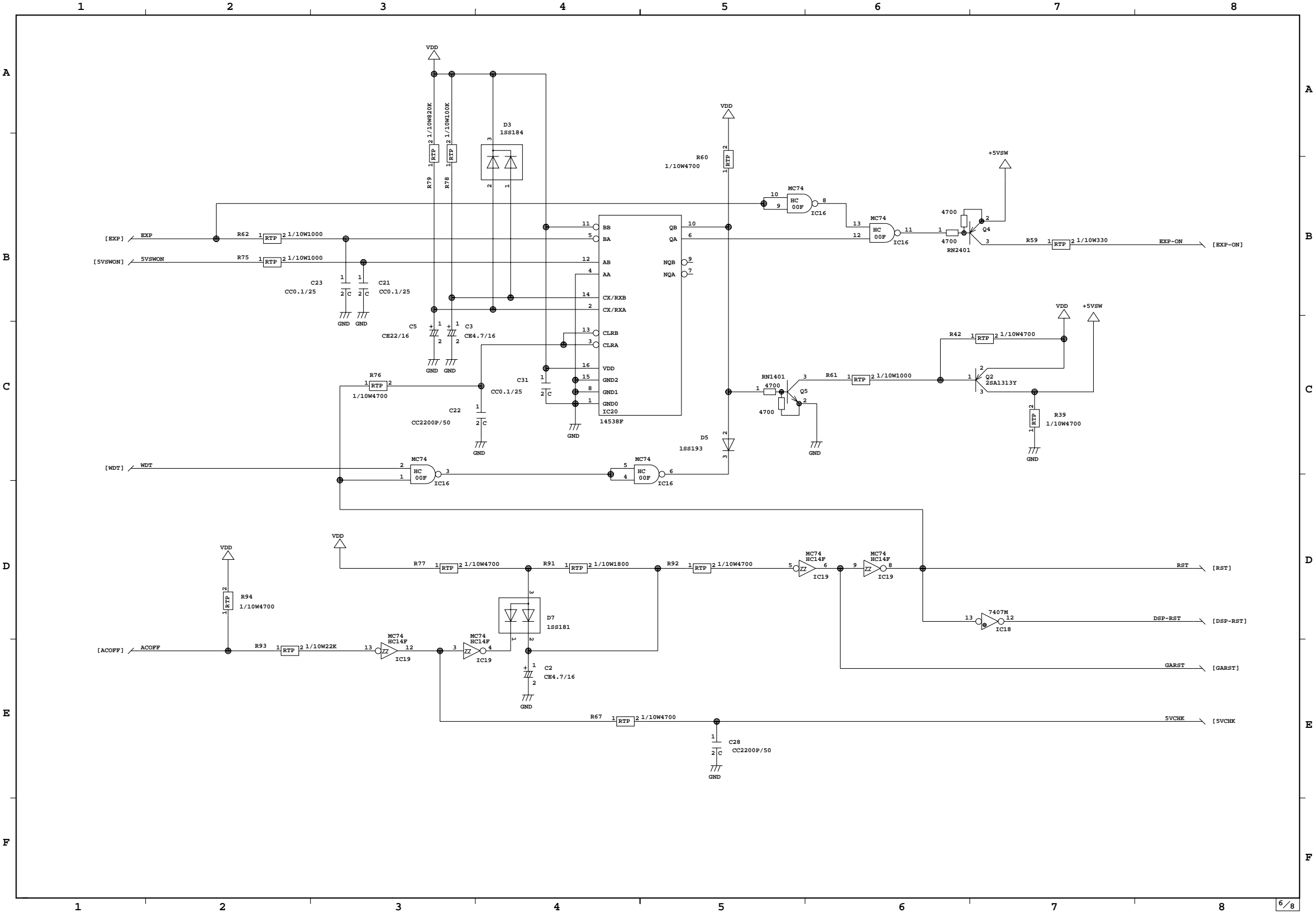
Mar. 1998 © TOSHIBA



1560 Logic Circuit (PWA-F-LGC) 6/8



HINT
How to search for where a signal in a circuit diagram has jumped to.

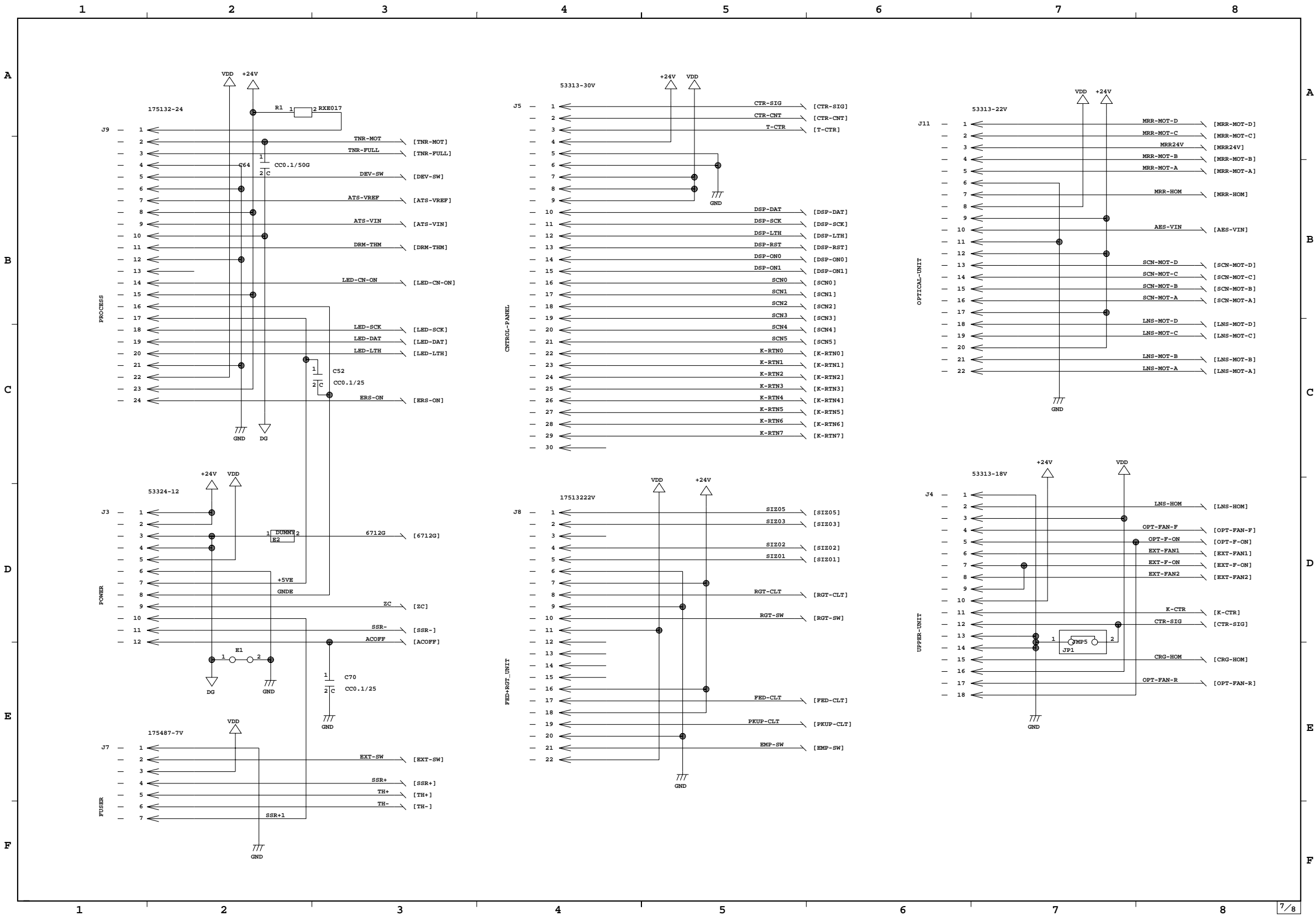


1560 Logic Circuit (PWA-F-LGC) 7/8



HINT

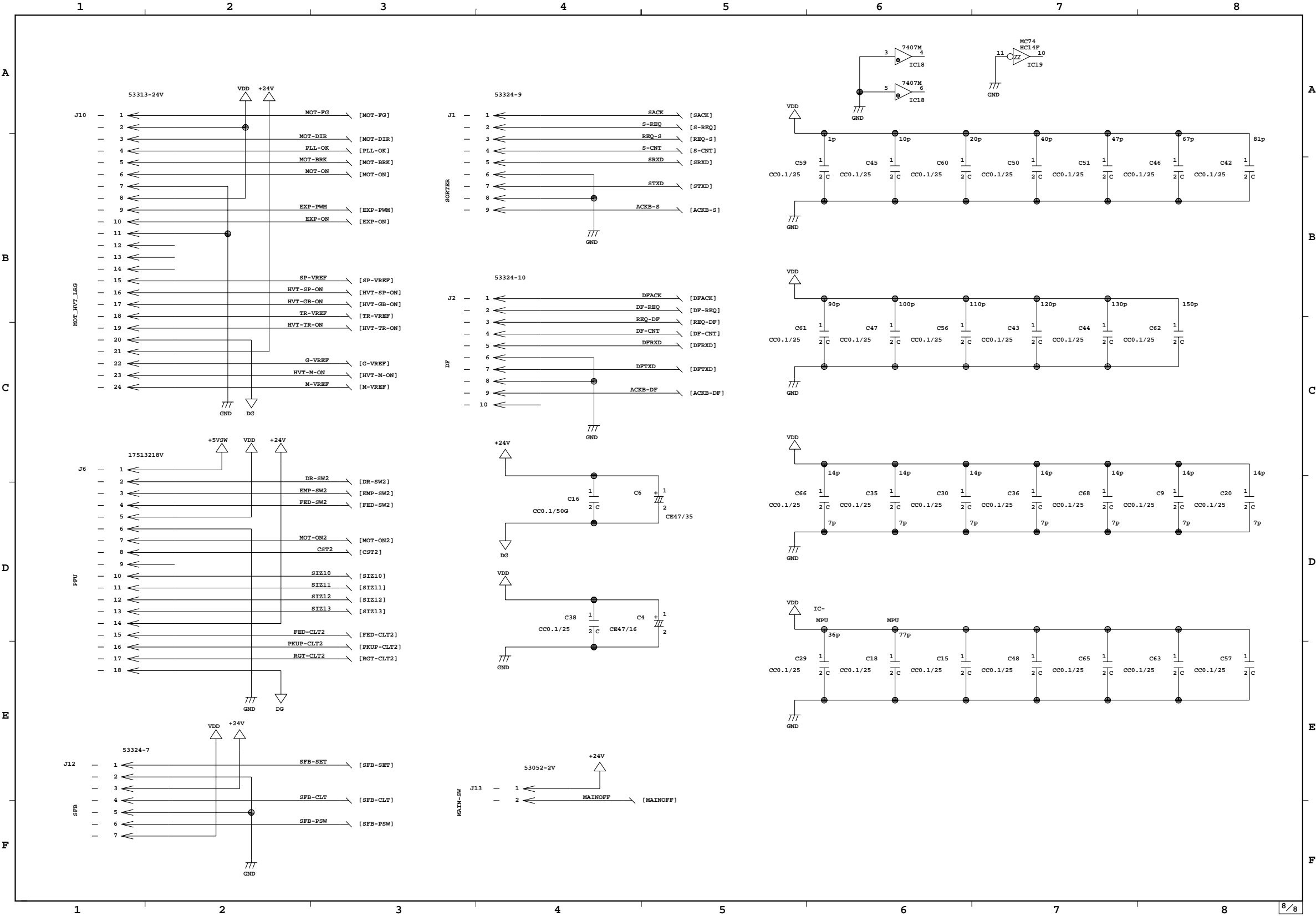
How to search for where a signal in a circuit diagram has jumped to.



1560 Logic Circuit (PWA-F-LGC) 8/8



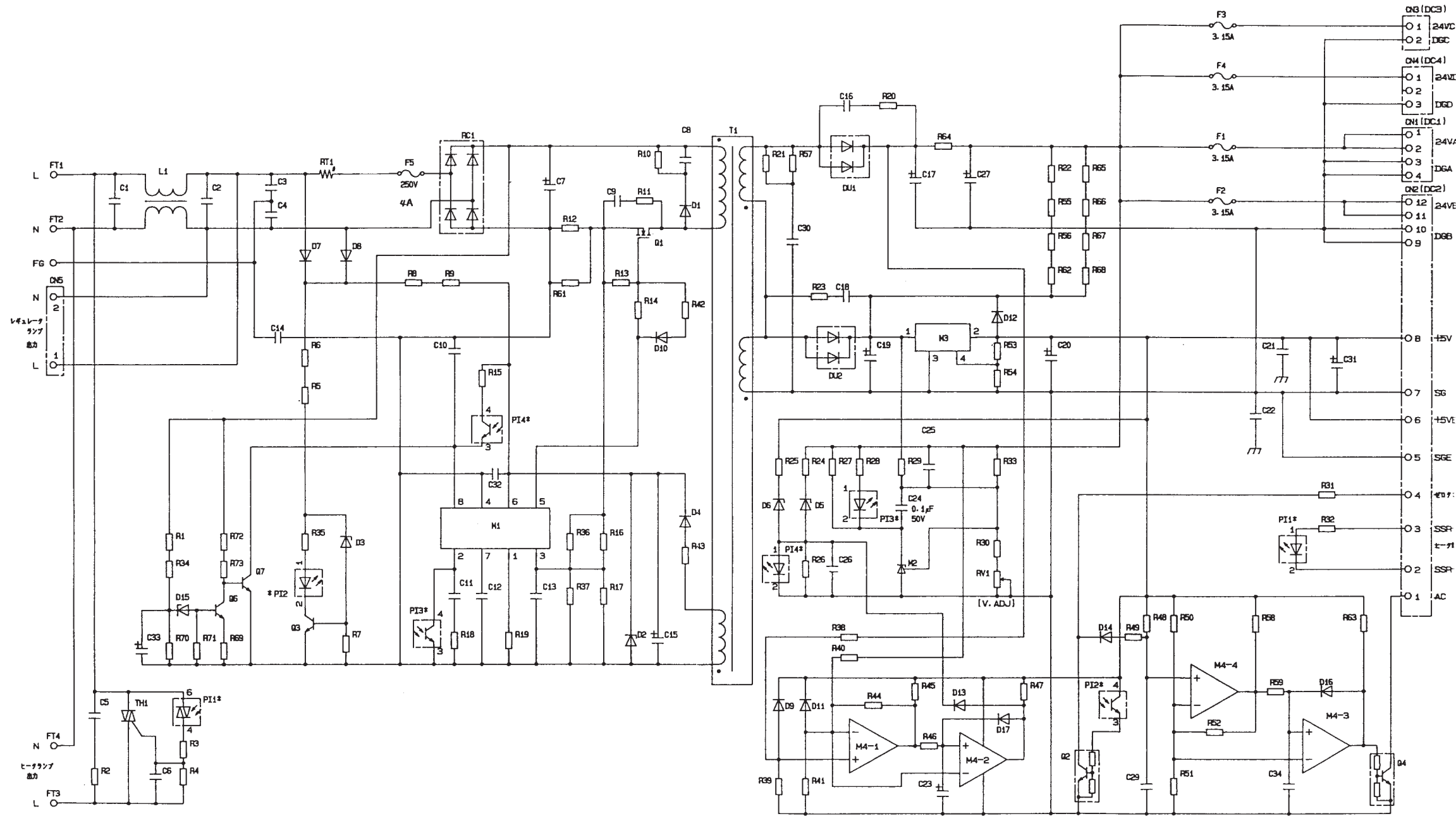
HINT
How to search for where a signal in a circuit diagram has jumped to.



14.2 Power Supply Circuit (PWA-F-PWR)



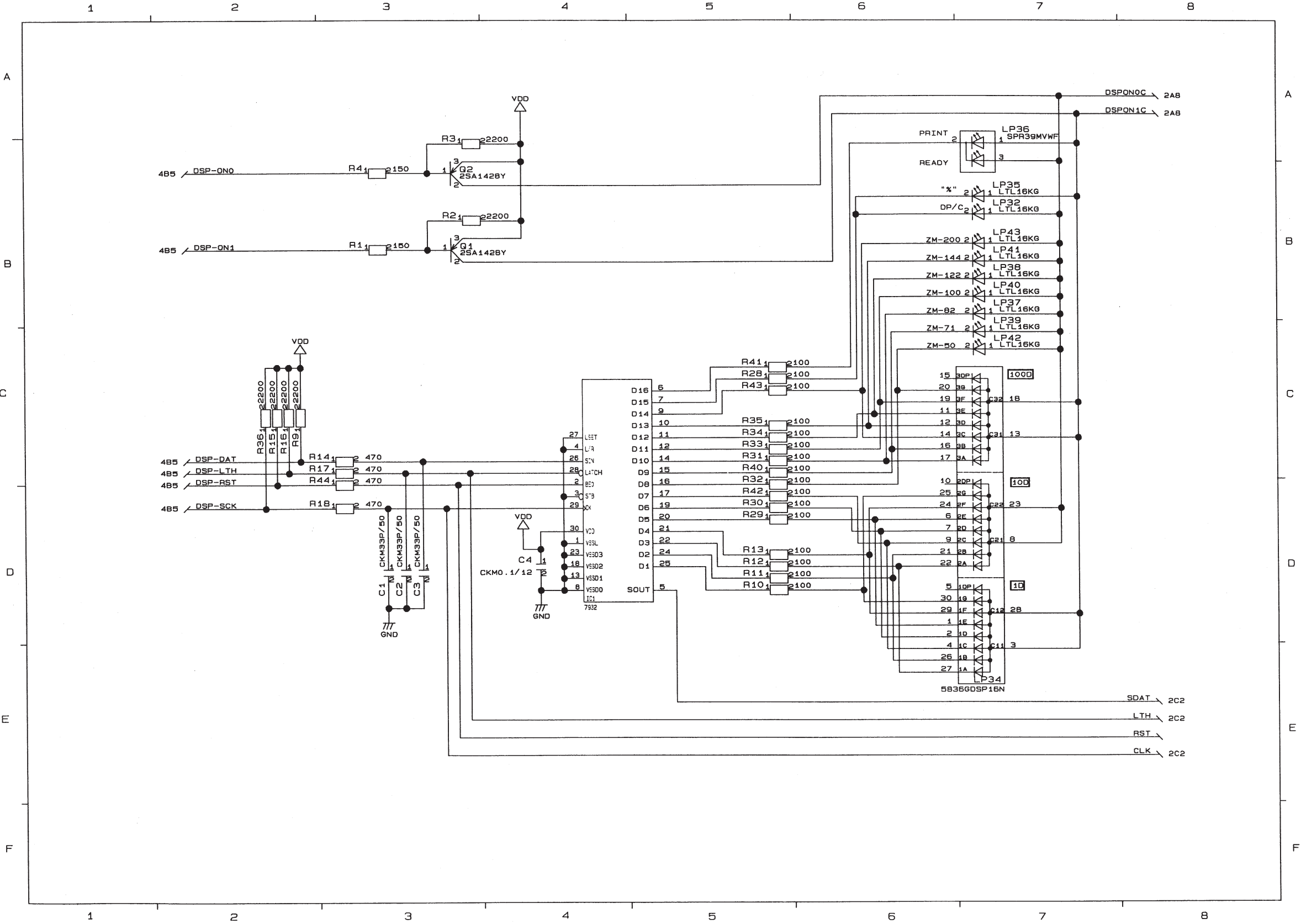
HINT
How to search for where a signal in a circuit diagram has jumped to.



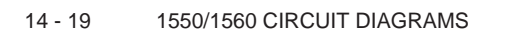
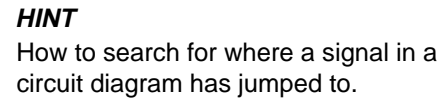
14.3 Control Panel Circuit (PWA-F-PNL) 1/4



HINT
How to search for where a signal in a circuit diagram has jumped to.



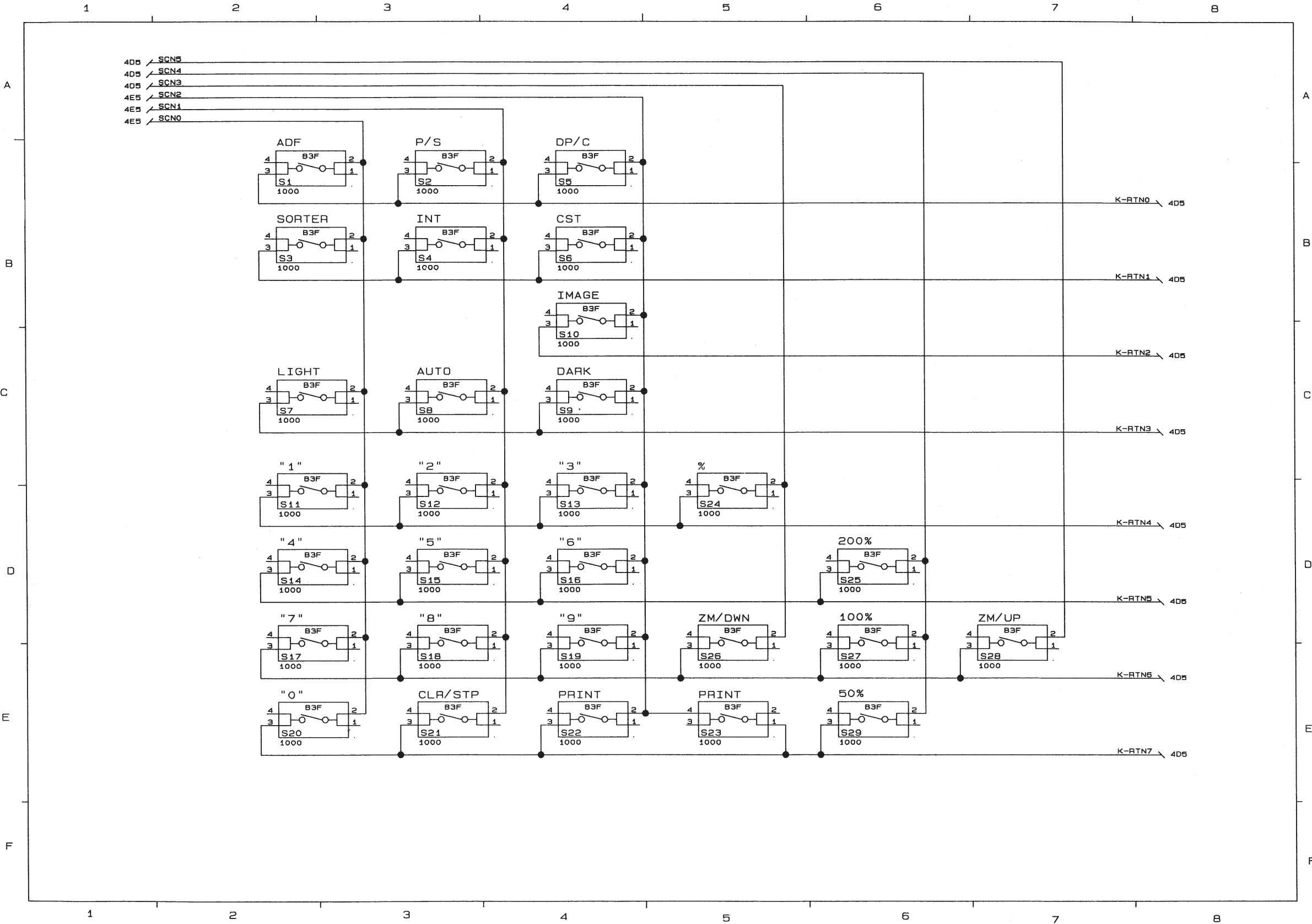
Mar. 1998 © TOSHIBA



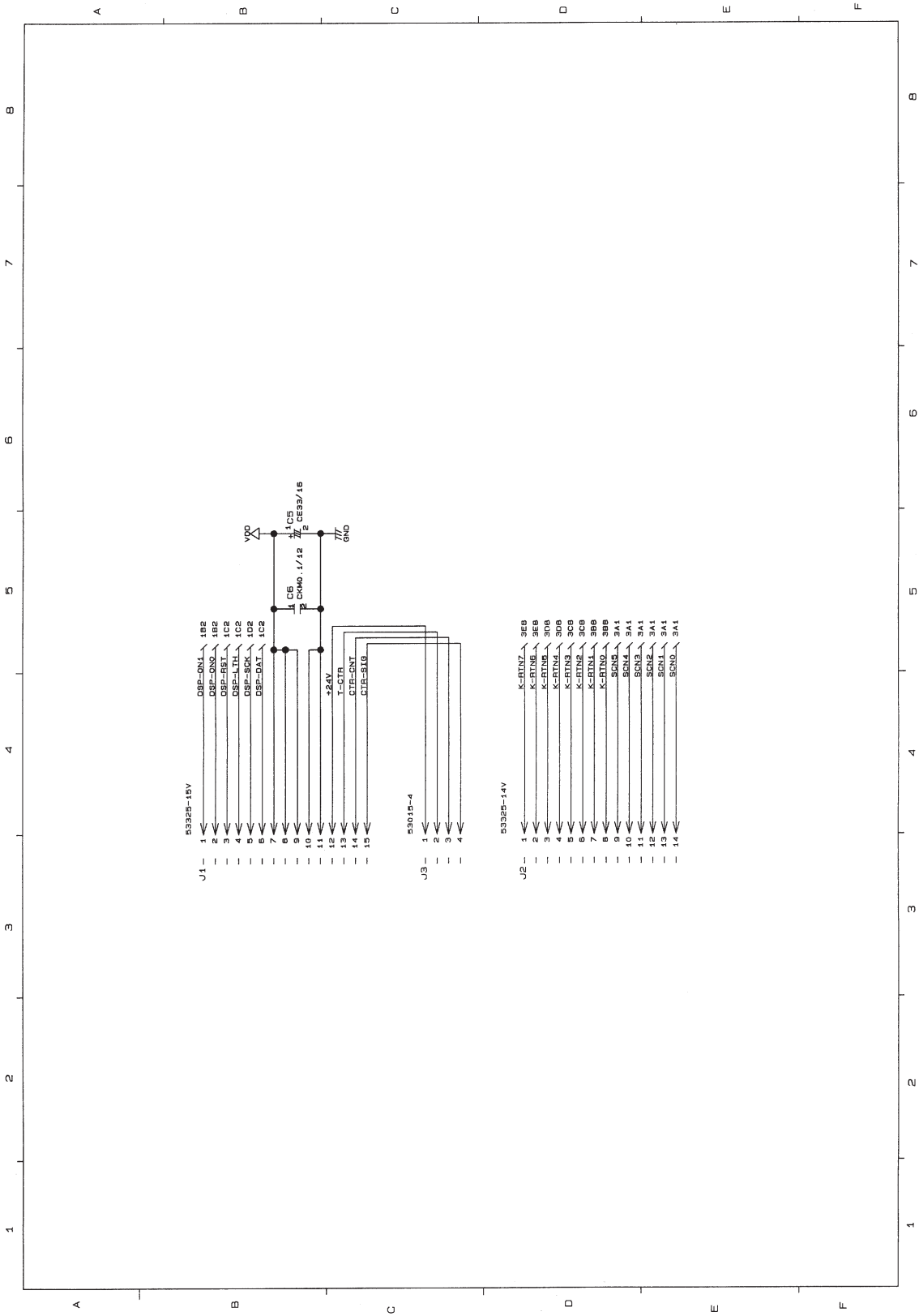
Control Panel Circuit (PWA-F-PNL) 3/4



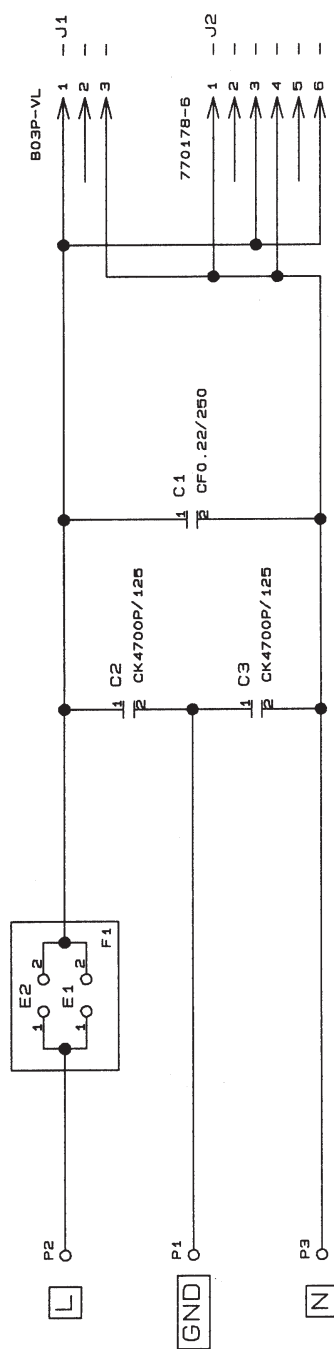
HINT
How to search for where a signal in a circuit diagram has jumped to.



Control Panel Circuit (PWA-F-PNL) 4/4



14.4 Fuser Circuit (PWA-F-FUS)



15. POWER STABILIZING CIRCUIT (AC UNIT)

15.1 General Description

This power supply circuit has the following outputs:

① DC outputs:

- +5V : Supplied to LSIs, logic ICs, driver ICs, etc.
- +5VE : Power supply for LED eraser array (DCH).
- +24VA : Power supply for the main motor (M1).
- +24VB : Power supply for clutches and high-voltage transformer.
- +24VC : Power supply for the optional sorter.
- +24VD : Power supply for the optional ADF.

② AC outputs:

- For driving the heater lamp
- For driving the lamp regulator

③ Other control signals:

- Zero-cross output : Zero-cross interrupting signals
- AC OFF signal : Reset signals

15.2 Explanation of Circuit Operation

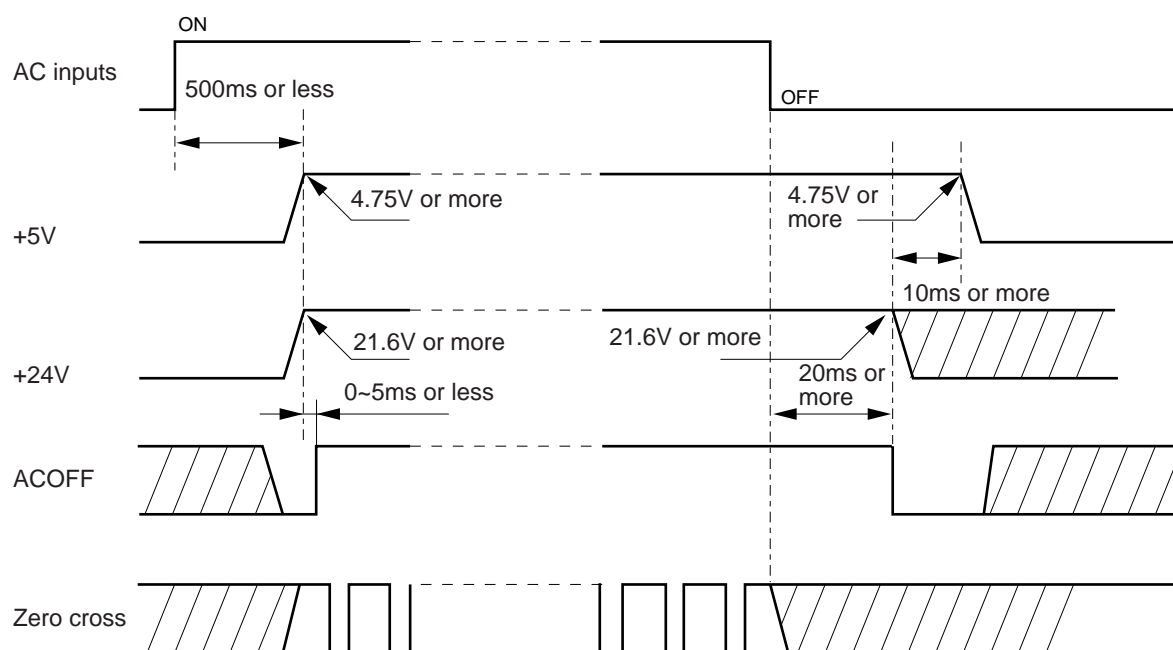
(1) DC + 24V

The +24V system, which is a rated voltage circuit based on the switching method, is always controlled to provide a fixed output voltage by feeding back fluctuation in the output to the primary side through a photocoupler.

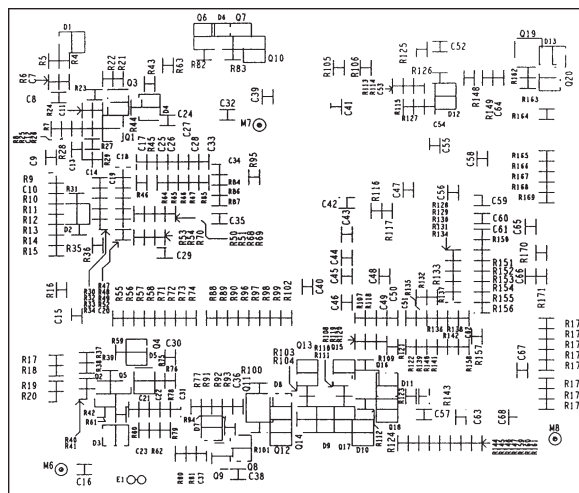
(2) DC + 5V

The +5V system is for providing a regulated 5V output by stabilizing the voltage from the 5V winding by means of a 3-terminal regulator.

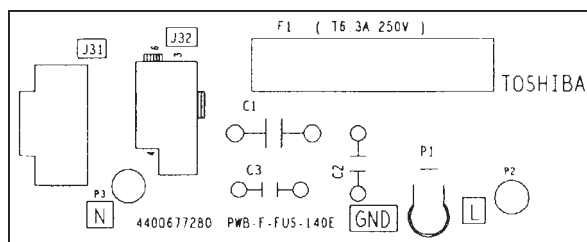
The following shows the output sequence of the power supply.



16.1 PWA-F-LGC



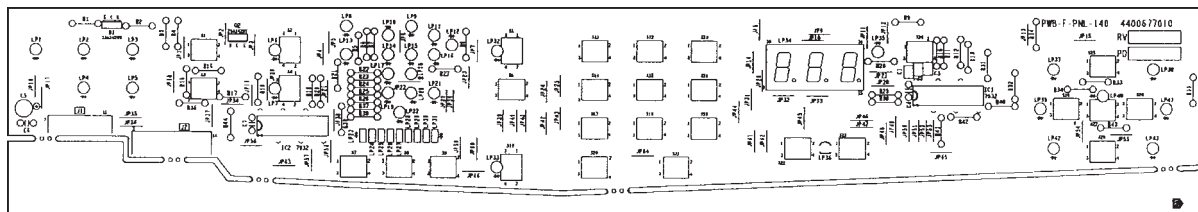
16.2 PWA-F-FUS



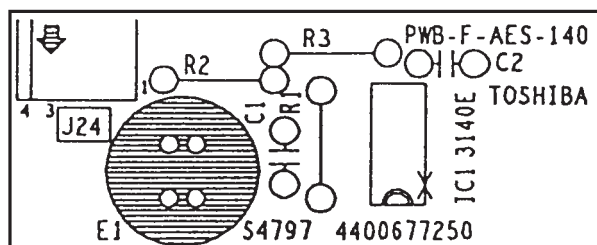
100V series

200V series

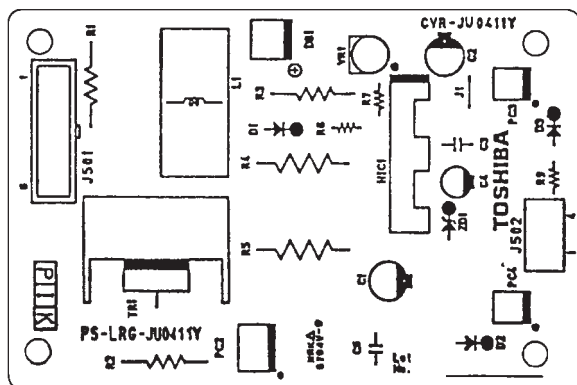
16.3 PWA-F-PNL



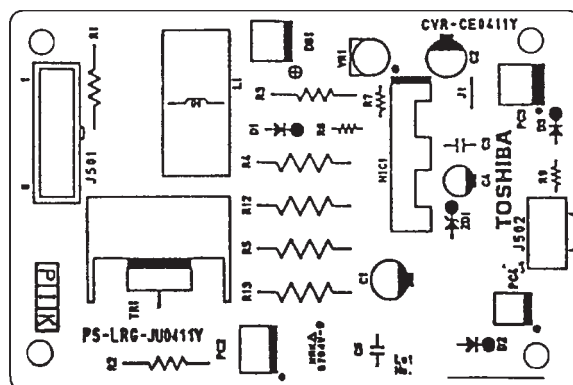
16.4 PWA-F-AES



16.5 PWA-F-LRG



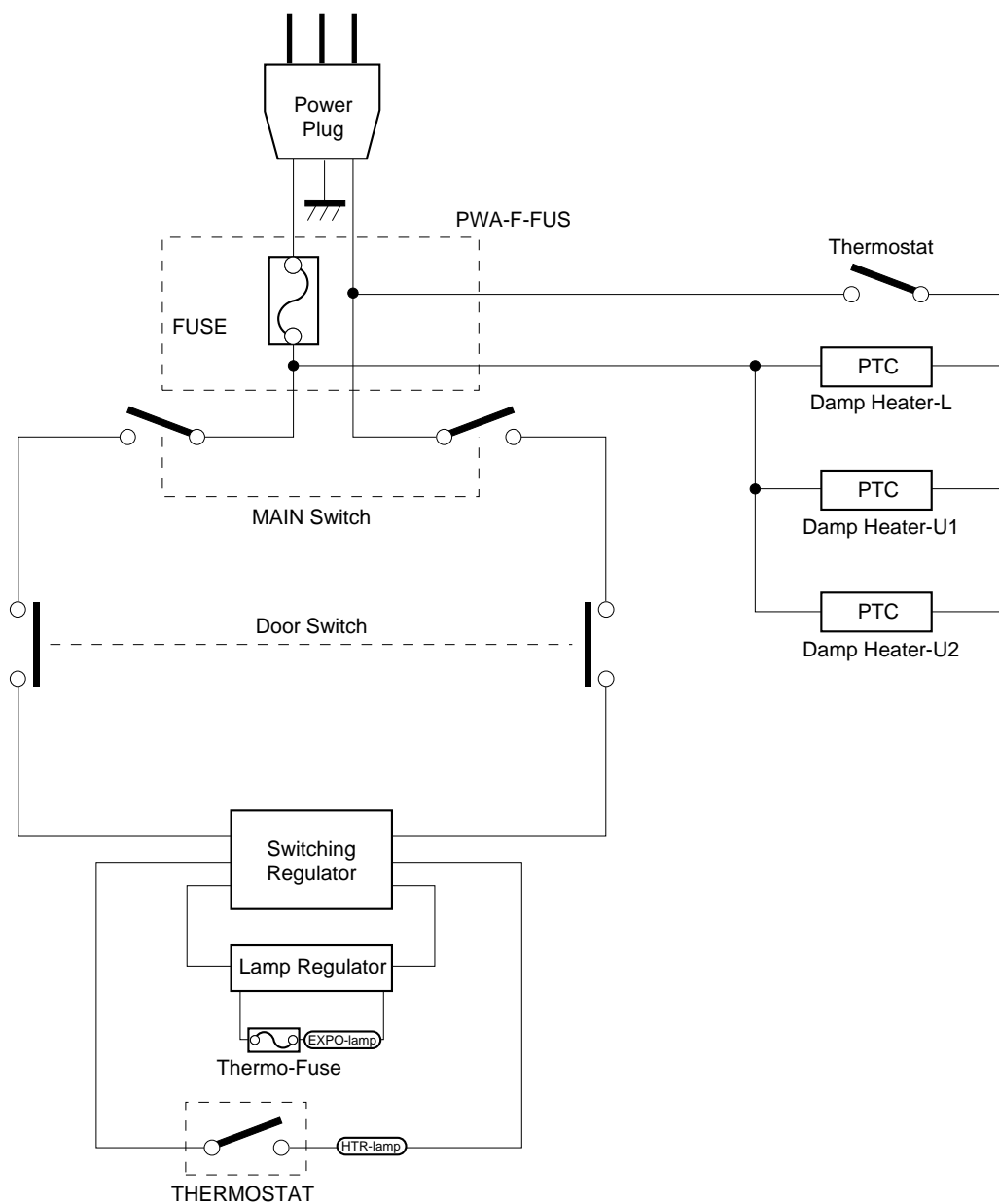
100V series



200V series

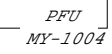
17. HARNESS CONNECTION DIAGRAM

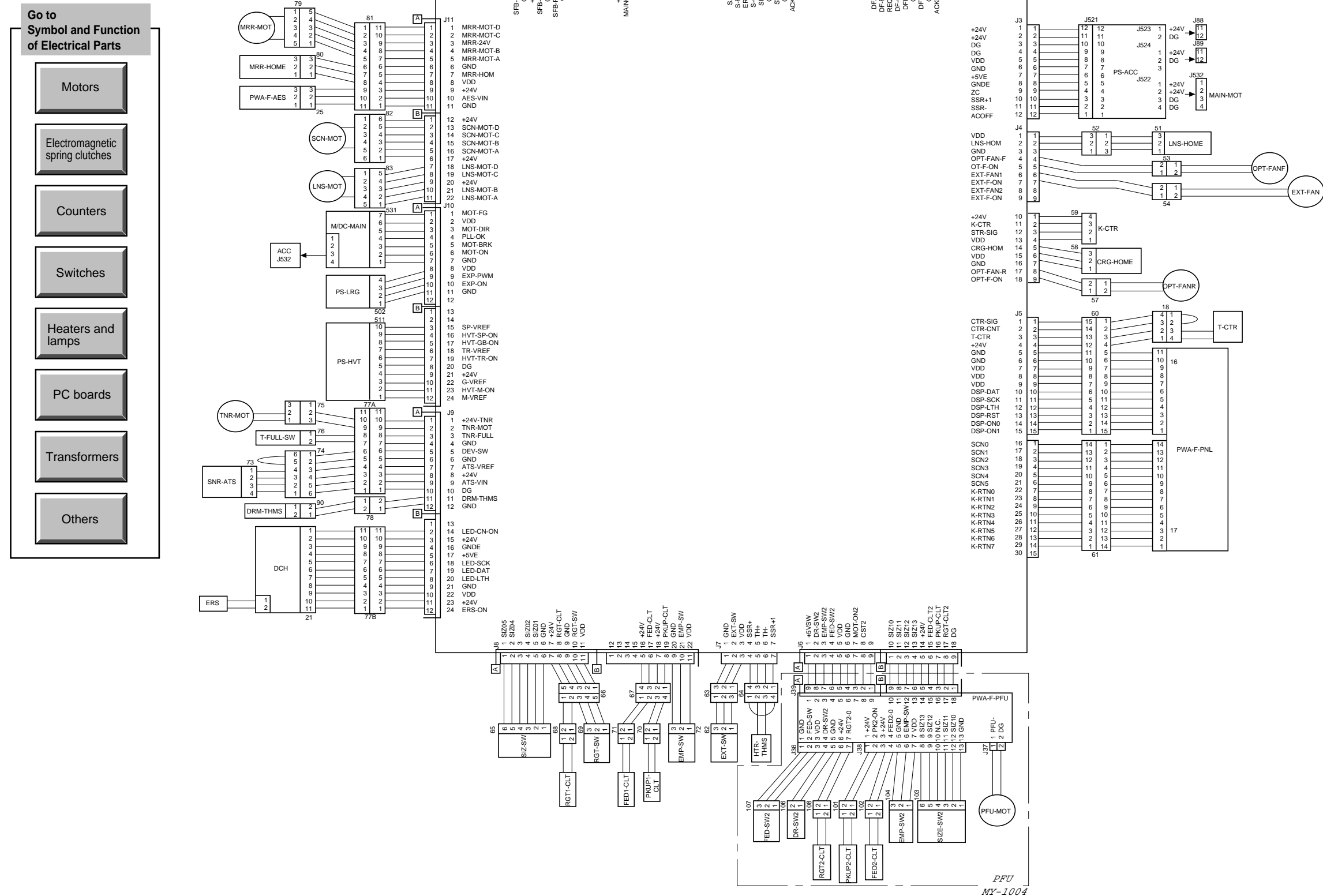
17.1 AC Harness Connection Diagram



AC Control Circuit

17.2.1 1550





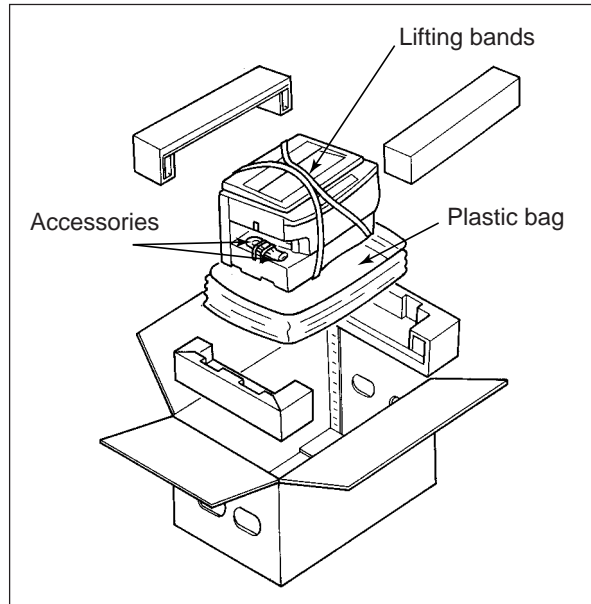
18. UNPACKING PROCEDURE

18.1 Unpacking and Set-up Procedure for the 1550

A. Unpacking Procedure

1. Open the carton and take out the accessory package and other packing materials. The accessory package includes the following parts:

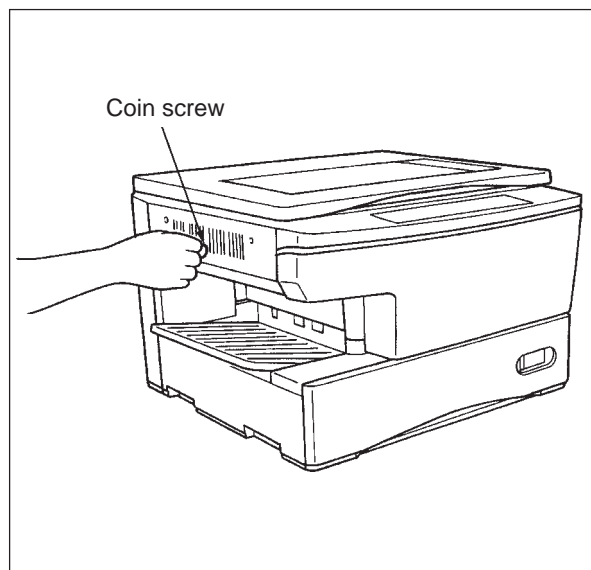
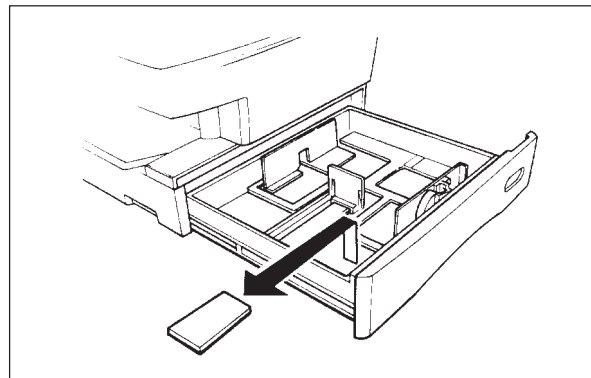
- Copy receiving tray
- Set-up report (U.S.A., Canada, Europe)
- Operator's manual
- Fuser unit lever caps (2 pcs.)
- Set-up instruction



2. Open the plastic bag and holding the lifting bands, take out the machine from the carton.
3. Remove all packing materials from the outside and inside of the machine.
4. Pull out the cassette and take out the packing material located at the front side.
5. Remove the screw fastening the carriage.

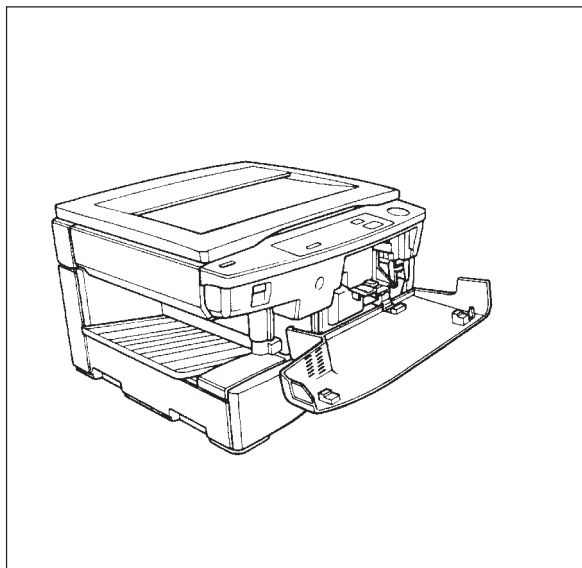
Note: For the screw fastening the carriage, a coin screw is used. So, after loosening it with a suitable coin, the screw can be removed by manually turning it.

- Remove the carriage fastening screw located in the left-top cover.



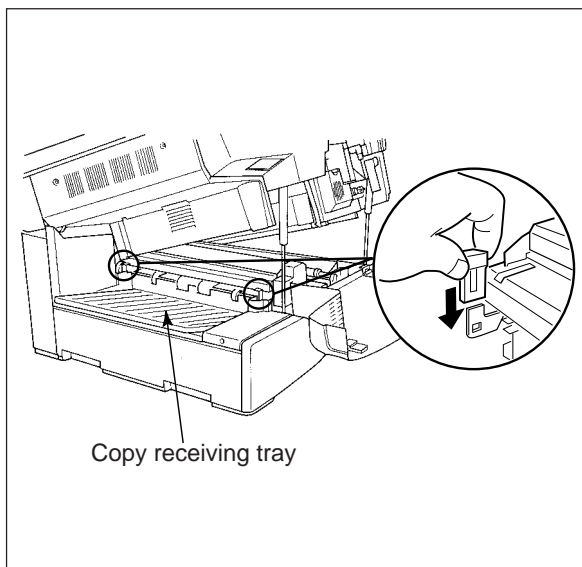
6. Open the front cover:

- Open the front cover and raise the upper unit.



7. Install the fuser unit lever caps (2):

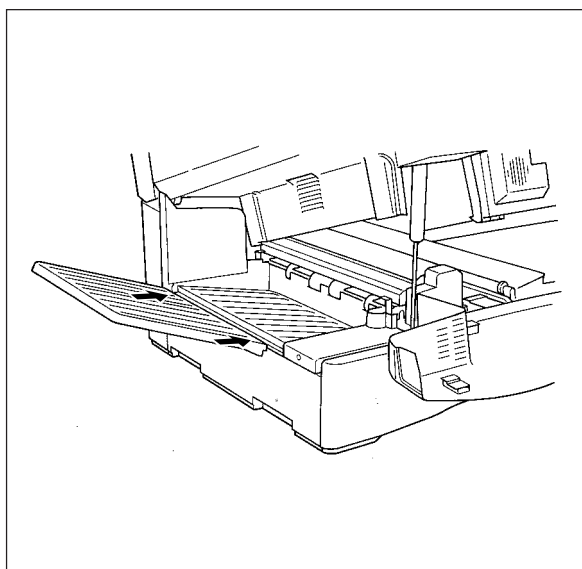
- * The lever caps are provided in the accessory package.
- Securely fit the lever caps onto front and rear levers.



B. Set-up Procedure

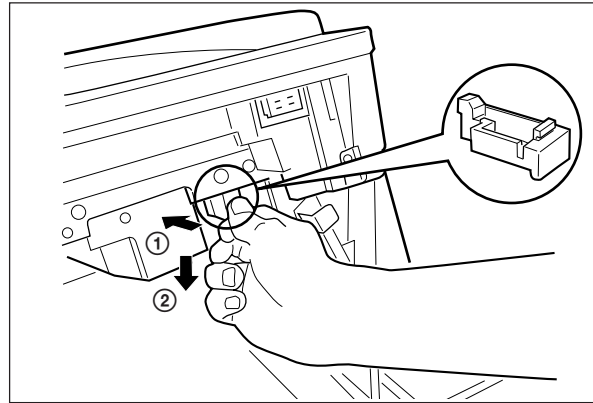
1. Installing the copy receiving tray

- Install the copy receiving tray by fitting it into the holes in the left-side cover.

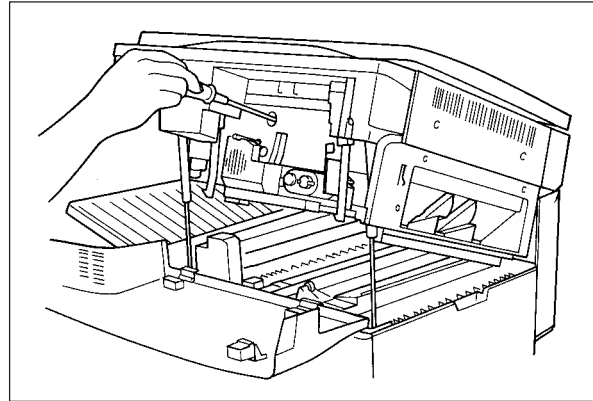


2. Setting the developer unit

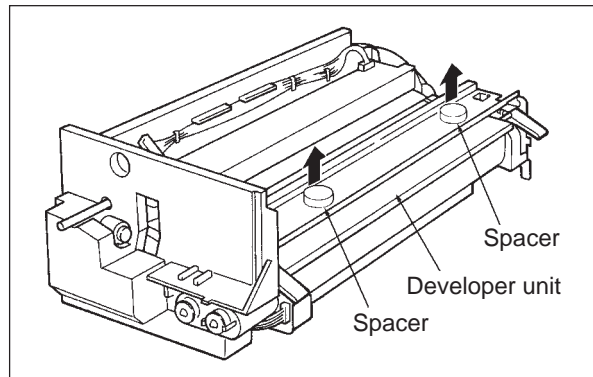
- (1) Remove the part fastening the lens unit from the machine.
 - Push it to the rear side and lower it simultaneously to remove it.



- (2) Take out the process unit (1 screw).

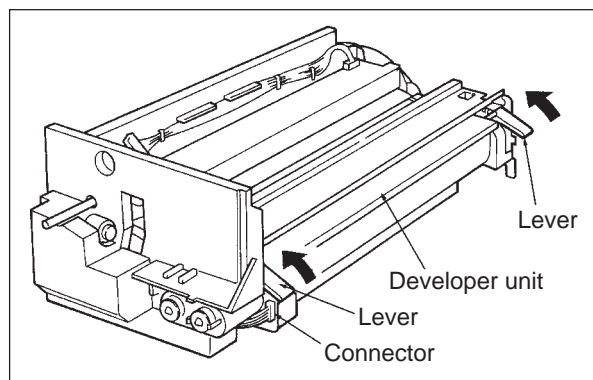


- (3) Remove the developer unit spacer from the process unit.

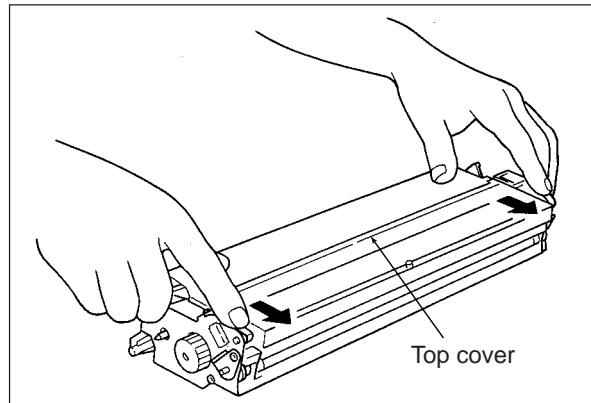


- (4) Place the process unit on a flat surface.
Raise the lever located on each side of the process unit in the direction of the arrow.
- (5) Pull out one connector.
- (6) Take out the developer unit from the process unit.

Note: If the photoconductor is exposed to fluorescent light or external light for long time, it may suffer from light-caused fatigue. So, be sure to cover the process unit with, for example, a suitable cloth.



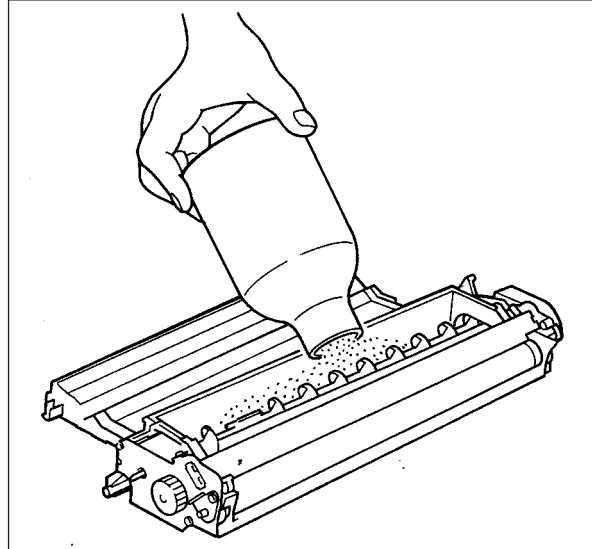
- (7) Push the hook located on each side of the developer unit with your fingers in the direction of the arrows to disengage them and then remove the top cover.



- (8) Pour in the developer material.

Note: Before pouring in the developer material, be sure to shake the developer bottle fully.

- (9) By rotating the magnetic roller, check to make sure that the developer material is transported properly.



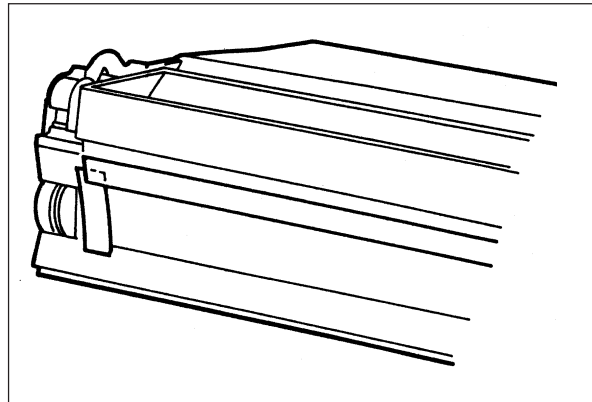
- (10) Reinstall the top cover. The two hooks should be securely latched.

Make sure that the top cover is securely closed. Also, make sure that the rubber seal of the top cover is positioned outside of the side seals (both sides).

- (11) After placing the developer unit in the process unit, move down the lever on each side by 90° to fix the developer unit. Be sure to insert the connector securely.



- (12) Reinstall the process unit into the machine (1 screw).

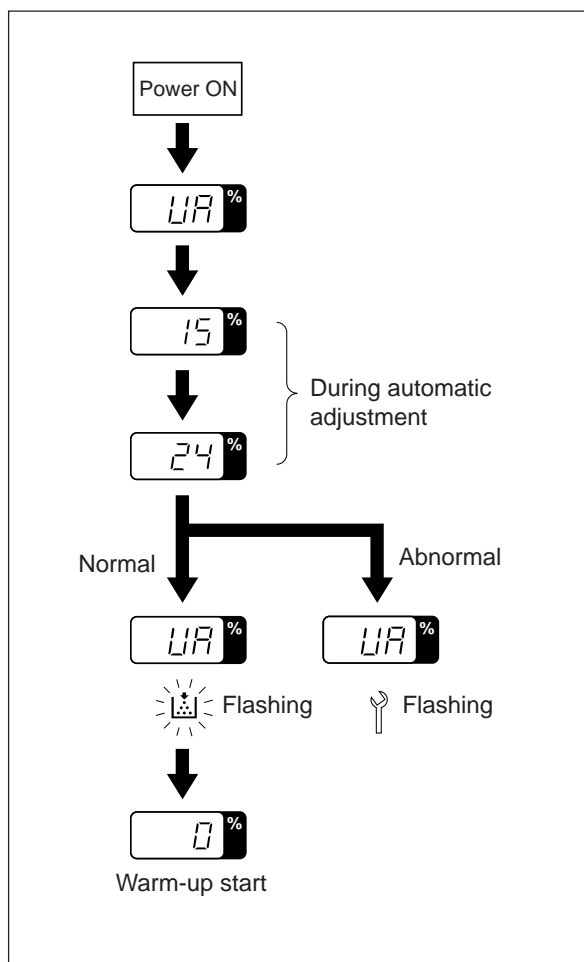
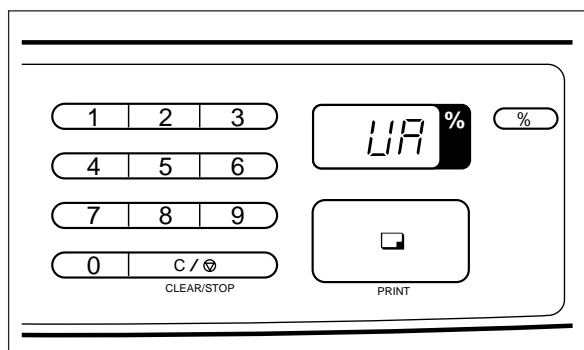
Note: Be sure not to install the toner cartridge at this time.



C. Adjustment Procedure

1. Automatic adjustment of the auto-toner sensor

- (1) When the power switch is turned on, the auto-toner sensor is automatically adjusted by the following procedure.
- (2) "UA" is shown on the copy quantity display and the PRINT key lights in red.
And the automatic adjustment of the auto-toner sensor starts.
- (3) The machine starts its operation. The output value of the toner sensor is shown on the display and changes quickly.
- (4) About 2 minutes and 30 seconds later, the value on the display stabilizes at 23 – 25.
- (5) About 30 seconds later, the automatic adjustment of the auto-toner sensor is complete and "UA" is shown on the copy quantity display. Also, the ADD TONER  is displayed.
- (6) Open the front cover and install the toner cartridge.
- (7) Close the front cover.
 - If the adjustment has finished abnormally, the machine stops its operation and displays the CALL SERVICE . Then, for the subsequent adjustment of the auto-toner sensor, follow the procedure described in the Service Manual.



D. Final Operation Check

Making copies in both the cassette and bypass feeding modes, check the following items:

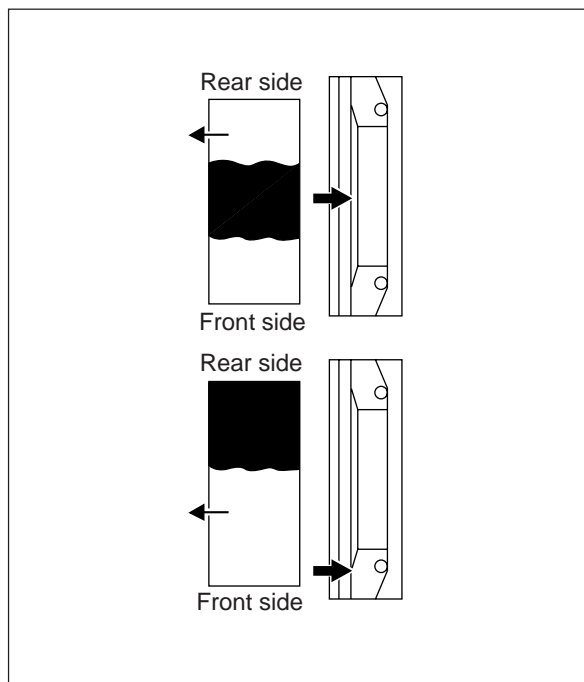
- Check for correct paper feeding from both the cassette and sheet bypass.
- Check for proper copy image.
- Check for correct displaying of the control panel lamps and the correct operation of the keys.

Note: Dispose of the packing materials properly.

E. Changing the Image Settings


1. Light distribution adjustment

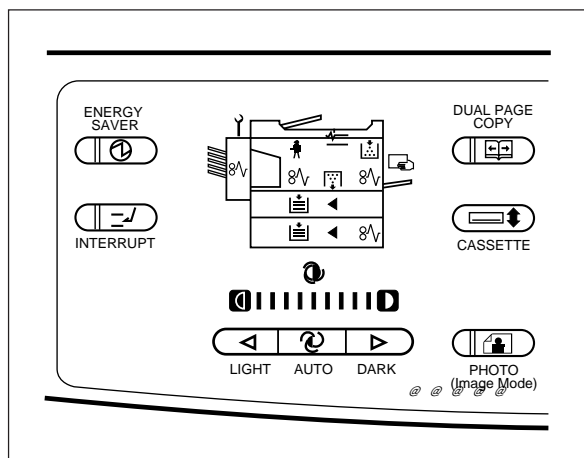
- (1) With the exposure set at a darker point, make a copy of the test chart and check for uneven light distribution.
- (2) If necessary, make adjustment in the following manner:
 - a) Turn off the power and unplug the power cord plug. Then, remove the right-hand top glass holder (2 screws) and the glass.
 - b) Loosening the screw of the adjustment plate corresponding with the position of the uneven light distribution, adjust the plate:
If you move it toward the left, copy image becomes darker and if you move it toward the right, copy image becomes lighter.
 - c) If the rear side of the copy is too dark and gradually lighter toward the front, adjust the adjustment plates as shown on the right (lower).
 - d) Make a copy of the test chart and check for the correct image density.










2. Exposure adjustment

2.1 Adjustment of manual exposure (100%)


- (1) Turn off the power of the machine. While pressing keys **0** and **5** simultaneously, turn on the power switch.
 - Check that the "AJ" mode is shown.
- (2) Press the Auto Exposure  key to switch to manual exposure. (Check that the Auto Exposure lamp has gone off.)
- (3) Using the exposure keys, set the exposure level at the center point.

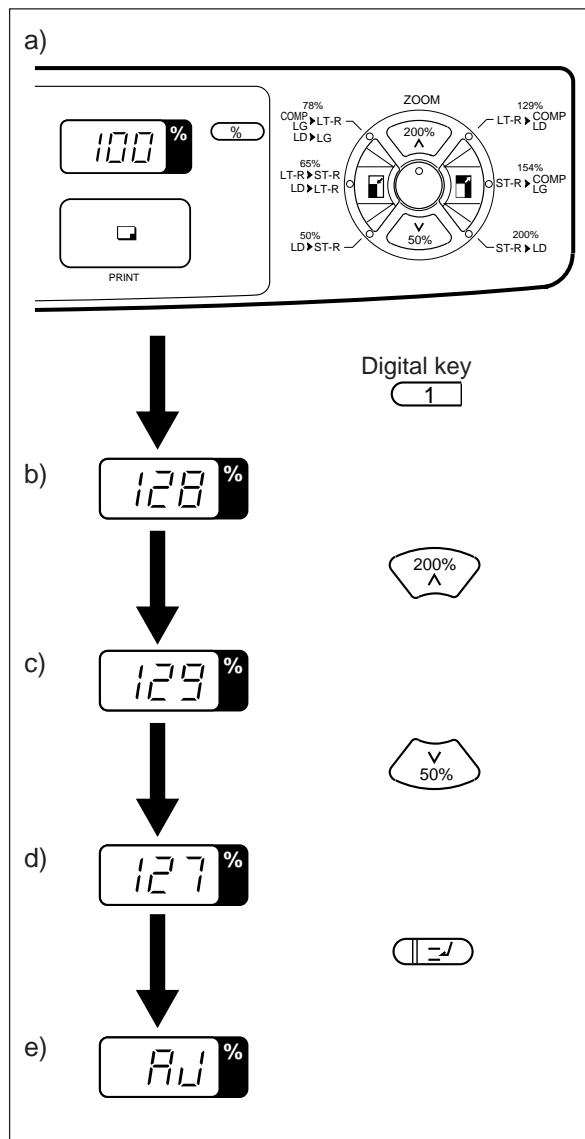


- (4) Press the  key to set at 100% mode.
- (5) To check the current image density, press the ENERGY SAVER  key to make a test copy.
- (6) If the image density is not appropriate, make adjustment using the following procedure:
- (7) Key in code "1" from the 10-key pad and press the PRINT  key.
 - The current adjustment value is shown on the display.
- (8) If the image density is too high, increase the value by using the ZOOM UP  key.
- (9) If the image density is too low, reduce the value by using the ZOOM DOWN  key.
- (10) Press the INTERRUPT  key to cause the new value on the display to be memorized.
 - After you press the key, the display returns to "AJ".
 - Press the ENERGY SAVER  key to make a test copy.
- (11) If the image density is not appropriate, repeat steps (7) – (10) above.

2.2 Adjustment of manual exposure (50%, 154% and 200%)


Note: Before performing manual exposure adjustment (50%, 154% and 200%), check to make sure that manual exposure adjustment for 100% has been properly done.

- (1) Make copies at 154%, 50% and 200% reproduction ratios, respectively. (In the "AJ" mode, if you press the ENERGY SAVER  key, copies will be made.)
- (2) If the image density is not appropriate for certain reproduction ratios, perform manual exposure adjustments (a), (b) or (c) in Sec. 2.4 for the inappropriate ratios.




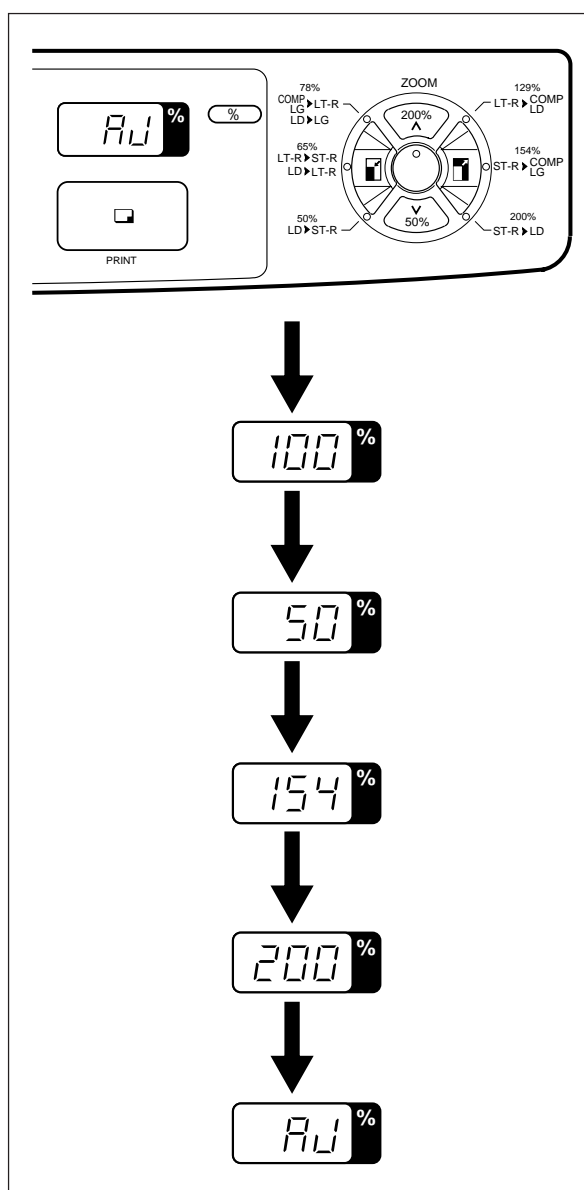
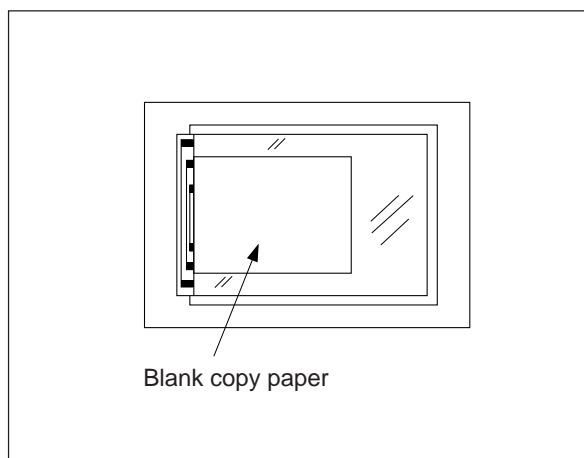
2.3 Automatic adjustment of auto exposure (50%, 100%, 154% and 200%)

Note: Before performing automatic exposure adjustment, check to make sure that manual exposure adjustment for 100% has been properly done.

- (1) Make sure that "AJ" is shown on the display.
- (2) Place blank A3-sized (or Ledger-sized) copy paper on the glass and set it against the original scale, then close the original cover.
- (3) After keying in code "49", press the PRINT  key and the automatic adjustment of auto exposure commences. (The carriage, lens unit and mirror unit, respectively, move to the positions corresponding to the four reproduction ratios, making the exposure lamp also to light four times.)

Note: Do not touch the machine while it is performing automatic exposure adjustment.


- (4) When the display changes to "AJ", the automatic adjustment is complete.
- (5) Make copies at the respective reproduction ratios and check the image density. (In the "AJ" mode, simply press the ENERGY SAVER  key to make copies.)
- (6) If the image density of test copies is not appropriate for any reproduction ratio, make adjustments in Sec. 2.4 Automatic exposure adjustment (d), (e), (f) or (g) for the inappropriate reproduction ratio.





2.4 Manual adjustment of exposure

Note: Only when the user is not satisfied with the results of the exposure adjustments in Sec. 2.2 and 2.3, perform the manual adjustments of exposure (a) – (m) as described below.






Adjustment procedure	Exposure mode	Reproduction ratio	Adjustment code
(a)	Manual exposure center	154%	2
(b)		50%	3
(c)		200%	4
(d)	Automatic exposure	100%	5
(e)		154%	6
(f)		50%	7
(g)		200%	8
(h)	Light (max.)	100%	9
(i)	Dark (min.)	100%	10
(j)	Photo exposure	100%	14
(k)		154%	15
(l)		50%	16
(m)		200%	17


 Ⓒ


 Ⓓ


 Ⓔ

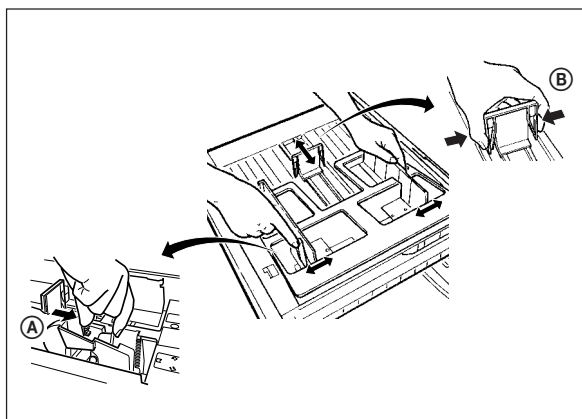
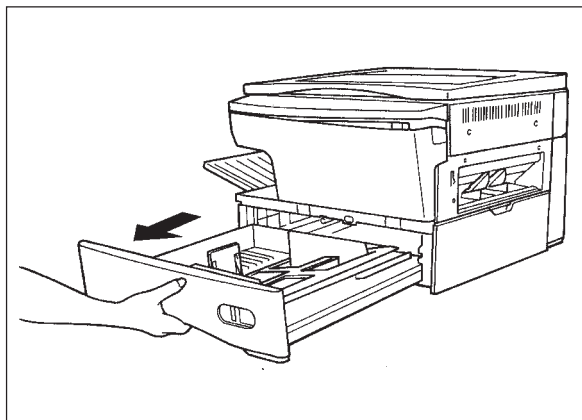
Adjustment Procedure

- (1) Make sure that “AJ” is shown on the display.
- (2) Set exposure mode Ⓒ.
- (3) Set reproduction ratio Ⓓ using the REDUCE , ENLARGE , ZOOM DOWN  or ZOOM UP .
- (4) To check the current image density, make test copies in the manual, automatic and photo modes and check them for proper image density.
- (5) Key in adjustment code Ⓔ and press the PRINT  key.
Then, using the procedure of (7) – (11) in Sec. 2.1, make adjustments.
- (6) Finally, press keys 0 and 9 simultaneously to clear the test mode.

Changing the Paper Size of the Cassette

(1) Pull out the cassette and push down the bottom plate. Then move the both side guides and trail-edge guide to align them to the desired size.

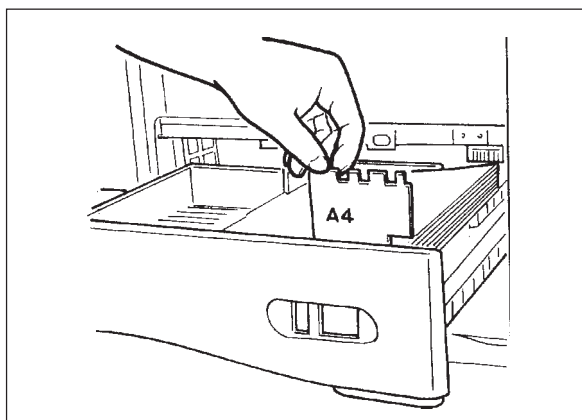
- Before moving the side guides, push the lever in the direction of (A) to unlock the side guides.
- Before moving the trail-edge guide, push on its sides in the direction of (B) to unlock the guide.



(2) Take out the paper size plate from the cassette and reset it to show the desired size on the display.

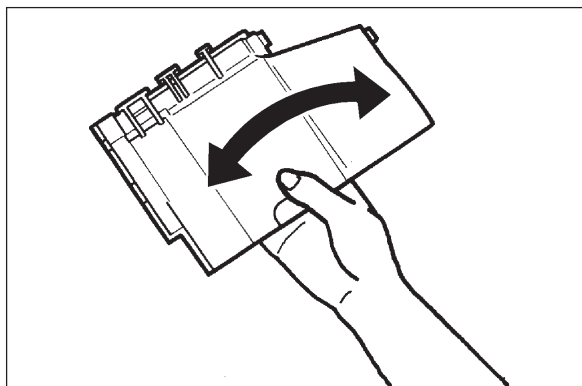
(3) Place the paper on the cassette and check the gaps between the paper and the side guides.

(4) Insert the cassette gently.



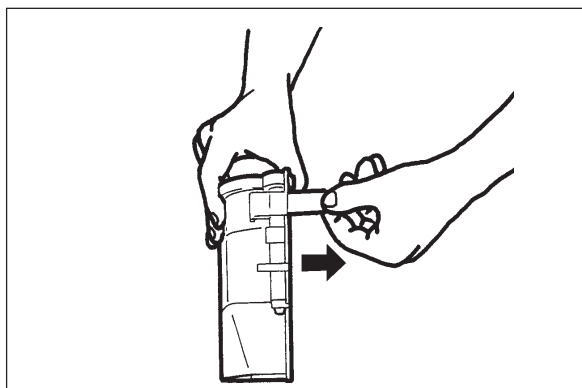
Procedure for Installing the Toner Cartridge

- (1) Open the front cover and pushing the lock lever, take out the toner cartridge from the front side.
- (2) Shake the new toner cartridge to the right and to the left 5 or 6 times to loosen the toner inside.



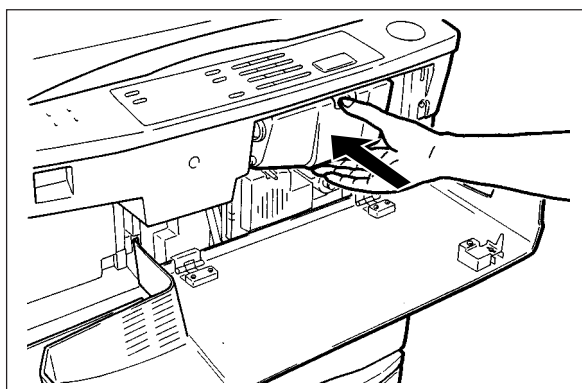
- (3) Pull to remove the seal from the new toner cartridge.

- Do not shake the toner cartridge after removing the seal (The toner may spill).



- (4) Install the new toner cartridge in the machine.
 - Push the toner cartridge fully in until it is locked securely.

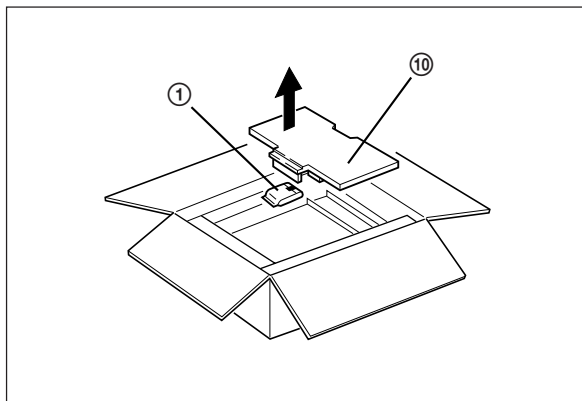
- (5) Close the front cover.



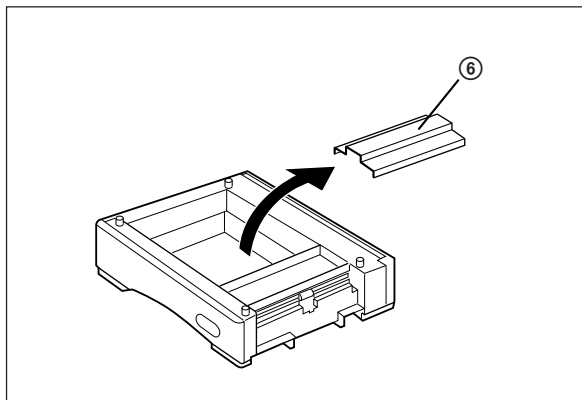
18.2 Unpacking and Set-up Procedure for the Paper Feeding Unit MY-1004

A. Unpacking Procedure

- (1) Open the carton and take out the package ① and the paper guide ⑩.
- (2) Remove packing materials and take out the paper feeding unit MY-1004.



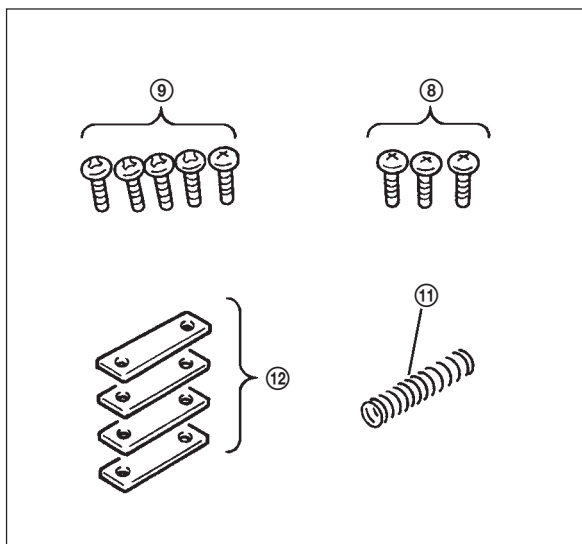
- (3) Remove packing material ⑥.



- The following parts are included in the package ①:
 - Tapping screws (M4 x 8, 3 pcs.) ⑧
 - Screws (M4 x 6, 5 pcs.) ⑨
 - Separation roller pressure spring (1 pc.) ⑪
 - Fixing plates (4 pcs.) ⑫

[Reference]

The applicable model is the ED-1550.



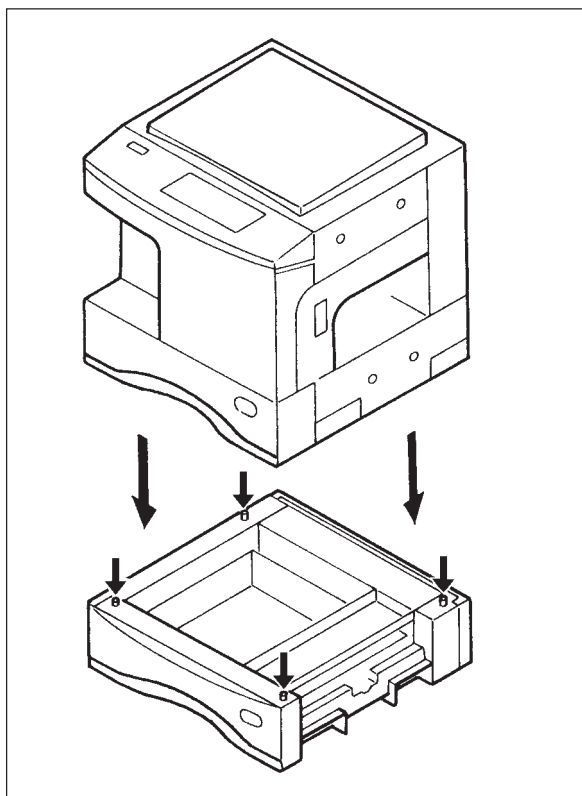
B. Installation Procedure

1. Docking the MY-1004 with the copier

- (1) Place the MY-1004 on the copier stand.
- (2) Using two people, lift the copier and place it slowly onto the MY-1004 so that the copier's cassette guide holes (not shown in the diagram) are aligned with the MY-1004's positioning pins.

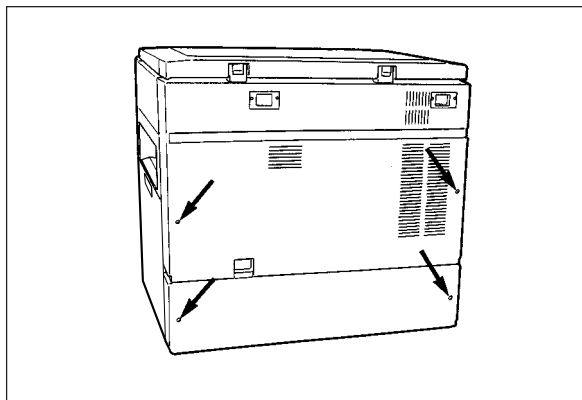
Notes: 1 When docking the MY-1004 with the copier, aligning the front and right-hand surfaces of the copier with those of the MY-1004, respectively, will make the installation easier.

2 Before the copier and the MY-1004 are fastened with screws (4 places), do not move or carry them to another place.

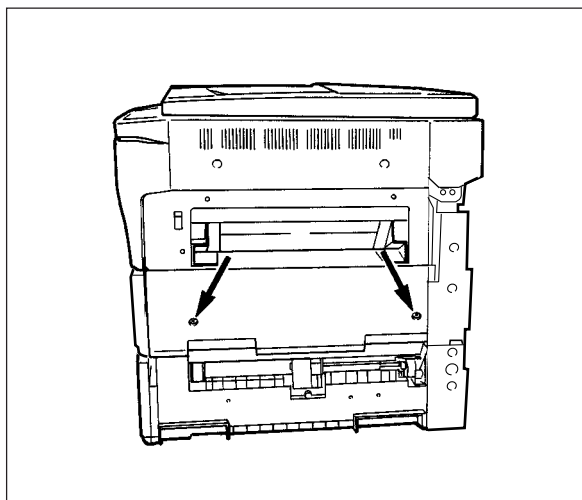


2. Removing the covers

- (1) Remove the rear cover of the MY-1004 (2 screws).
- (2) Remove the rear cover of the copier (2 screws).

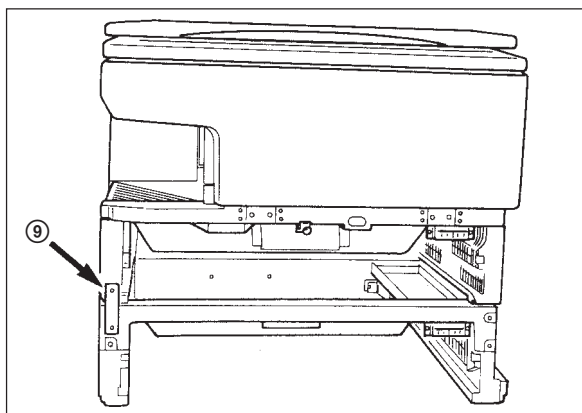


- (3) Remove the lower feed side cover of the copier (2 screws).

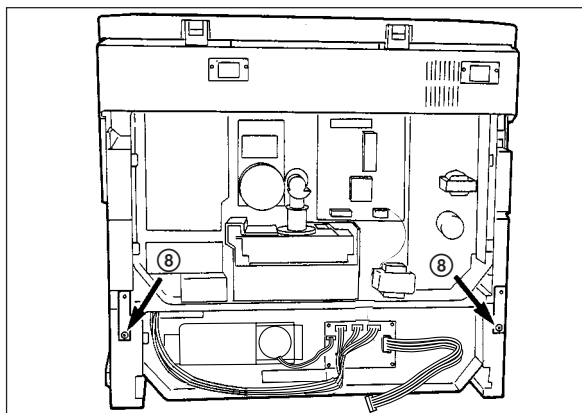


3. Fastening the MY-1004 and the copier

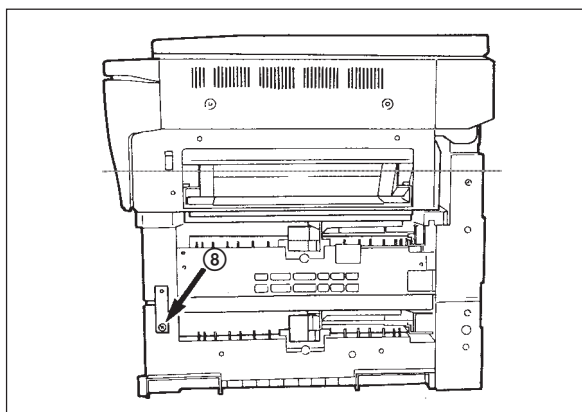
- (1) Remove the cassettes from the copier and the MY-1004, respectively.
- (2) Using the fixing plate and screws (⑧, ⑨) provided, fasten the copier and the MY-1004 as shown in the Figure.



One place at the front



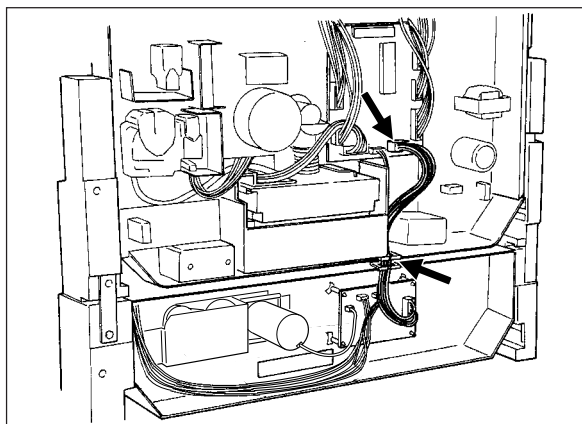
Two places on the rear



One place on the feed side

4. Installing the wire harness:

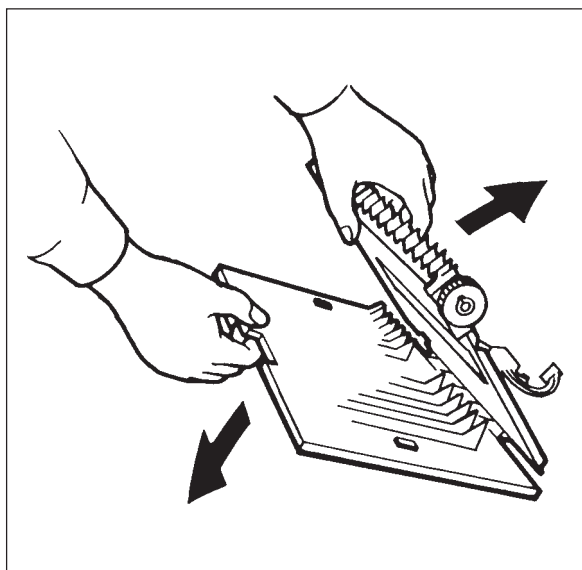
- (1) Fit the wire harness on the rear of the MY-1004 into the respective edge saddles of the copier and the MY-1004 and connect the harness to the J6 connector of the copier's PC board.



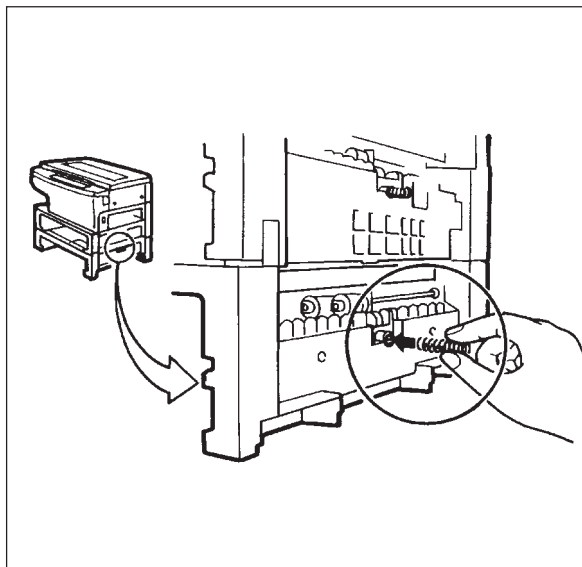
5. Installing the paper guide

- (1) The paper guide ⑩ provided has its metal guide section and outer panel section joined by magnets.

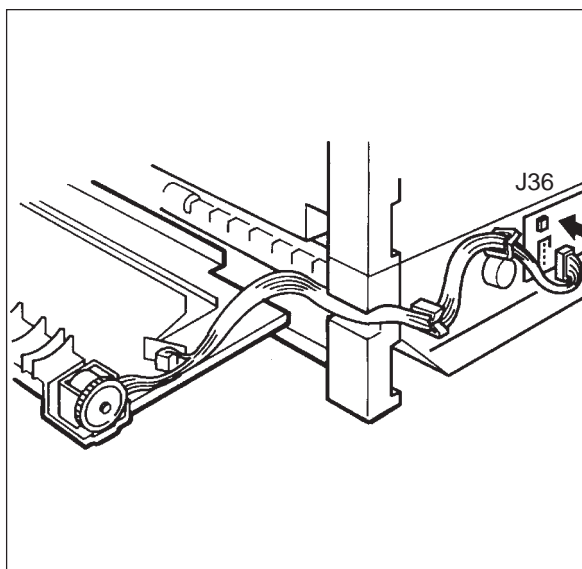
Separate them when installing the paper guide.



- (2) Insert the separation roller pressure spring ⑪ (provided) into the hole in the separation roller holder at the feed side of the MY-1004.



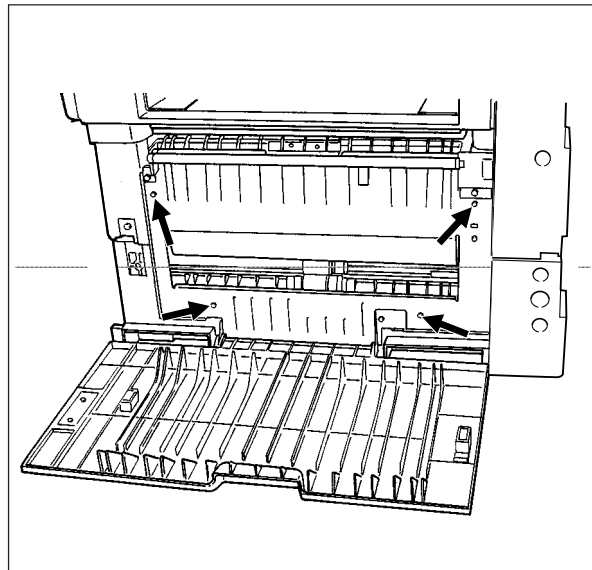
- (3) Plug the connector of the paper guide ⑩ into the connector J36 from the feed side of the MY-1004.



- (4) Fasten the paper guide ⑩ using the fixing screws ⑨ provided, as shown (4 places).

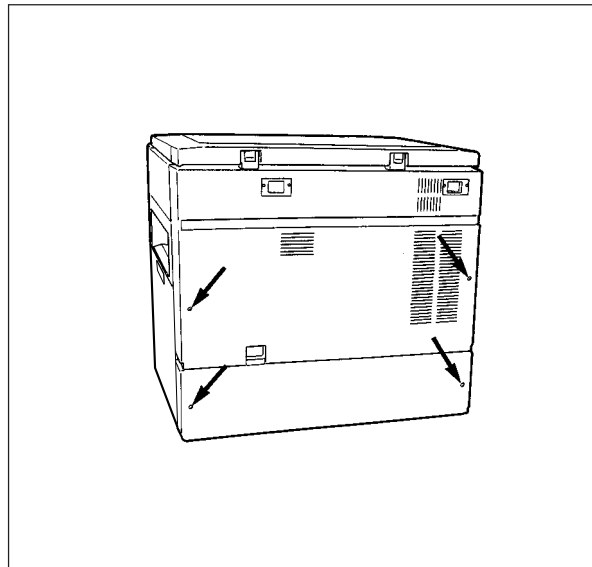
Note: When fastening the paper guide ⑩, check to make sure that the separation roller pressure springs ⑪ are fitted in the separation roller holders of the copier and the MY-1004, respectively.

- (5) Close the outer panel of the paper guide ⑩.



6. Reinstalling the rear covers

- (1) Reinstall the rear covers of the copier and the MY-1004.
- (2) Return the cassettes to the original positions, respectively.



C. Operation Check of the MY-1004

- (1) Plug the copier's power cord into the electrical outlet and turn on the power switch.
- (2) Set sheets of paper in the MY-1004's cassette.
- (3) Selecting the MY-1004's cassette, make a few copies and check that the MY-1004 operates normally.